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(54) Title: NAVIGATION PATTERN ON A DIRECTORY TREE

(57) Abstract: Navigation management occurs in a mobile device during a directory up-down scroll and it involves a user interface and a directory (e.g. mobile directory of photos). The directory is a tree-shaped hierarchy of nodes such that any node on the directory is selectable by a user via the user interface. This way navigation can flow up-down through the directory. Additionally, the navigation management involves associating a state and one or more action items with each node and saving the state. The state is an expanded or collapsed condition of the node. If the state of a particular node is expanded, additional nodes at a lower level of the hierarchy are presented to the user. If its state is collapsed only that particular node is presented and the other nodes are hidden. The user interface includes for any node selected by the user its associated one or more action items.



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## NAVIGATION PATTERN ON A DIRECTORY TREE

## REFERENCE TO PRIOR APPLICATIONS

This application claims the benefit of and incorporates by reference U.S. Patent Application 10/959,917, entitled "NAVIGATION PATTERN ON A DIRECTORY TREE," filed October 5, 2004,  
5 and U.S. Provisional Application 60/518,898 entitled "BACK BUTTON IN MOBILE APPLICATION," U.S. Provisional Application 60/518,858, entitled "NAVIGATION PATTERN ON A DIRECTORY TREE," U.S. Provisional Application 60/518,857, entitled "BACKUP AND RESTORE IN MOBILE APPLICATIONS," and U.S. Provisional Application 60/518,897, entitled "UPLOAD SECURITY SCHEME," all of which were filed November 10, 2003.

## 10 FIELD OF THE INVENTION

The present invention relates generally to wireless mobile devices and more particularly to applications that offer navigation in a directory tree. Among such applications, one type is a mobile photos application.

## BACKGROUND

15 Mobile-friendly technologies are advanced to provide a rich multimedia environment and enhance the wireless device users' experience. An outcome of this evolution is the manifest closeness between the wireless universe and the Internet domain, as well as the advent of wireless devices with multimedia capabilities. The newest versions of mobile wireless devices such as digital mobile phones, pagers, personal digital assistants (PDAs), handsets,  
20 and any other wireless terminals, have multimedia capabilities including the ability to retrieve e-mail, and push and pull information via the Internet.

However, because mobile devices typically have limited display size and an awkward navigation mechanism, it is always a challenge to navigate up/down a directory tree while simultaneously providing multiple action choices for a selected item. Hence, with a limited  
25 memory capacity, screen space and user interface capability, there is a need to optimize the mechanism for navigating a directory tree (a tree-shaped directory) and for taking context sensitive actions. The directory navigation approach presented here proposes a solution to this and related problems.

## SUMMARY

The present invention is based, in part, on the observation that a need exists for effective management of navigation in mobile devices, and that navigation patterns can be improved as described below. Accordingly, the navigation management concept is implemented providing  
5 a navigation pattern in a directory tree along with one or more context-specific action choices (menu or icons). For each selected item in the directory, the action choices can be different and tailored to that item.

The principles of the proposed directory tree navigation management apply equally well to any mobile application although it is illustrated here with reference to a mobile photos  
10 application program implemented as the client-side Yahoo !Photos program.

For the purpose of this invention, as embodied and broadly described herein, a method, a computer readable medium and a system are proposed as possible implementations of the navigation management concept. These implementations involve a mobile device that is typically capable of communicating with a server and other mobile devices. The mobile  
15 devices are often wireless devices such as wireless camera phones and the content is photograph data (or simply one or more photos).

In one embodiment, a method for managing navigation in mobile devices involves providing user interface in a mobile device, constructing a directory as a tree-shaped hierarchy of nodes, and providing the directory such that any node on the directory is selectable by a user via the  
20 user interface. This way, the navigation can flow up-down through the directory tree. This method involves also associating a state and one or more action items with each node and saving the state of each node. The state is an expanded or collapsed condition of the node, wherein if the state of a particular node is expanded additional nodes at a lower level of the hierarchy are presented to the user, otherwise if the state is collapsed only that particular  
25 node is presented and the other nodes are hidden. In this method there is the further step of providing in the user interface for any node selected by the user its associated one or more action items.

For any node that is selectable by the user, the one or more action items associated with that node are action choices provided in the user interface either as icons or as menu items.  
30 Moreover, for any node selectable by the user during the up-down navigation the number of action items associated with such node is determined by its nature, there being provided only

action items that apply to such node. Then, overflow indicators are provided when the number of these action items exceeds a maximum number of action items that fit in the user interface, wherein the overflow indicators enable the user to scroll back and forth through all these action items.

- 5 In a typical operation, initially, a visible part of the directory provided to the user includes a top level of the tree-shaped hierarchy of nodes in a collapsed state. But as selected ones of these nodes are toggled they are expanded and more nodes, at a lower level of the hierarchy, are made visible and when toggled again these higher-level nodes are again collapsed.

Typically also, the mobile devices are a wireless devices such as a wireless camera phones  
10 that download and run the Yahoo !Photos program. Thus, with Yahoo !Photos programs, the directory is a mobile album. In this case, the nodes in the tree-shaped hierarchy include a root node and any number of child nodes, such that any node that is childless is a leaf node which in the mobile album is a photo.

The approach described above can be implemented in a computer readable medium  
15 embodying a computer program with program code for providing the navigation. The computer program is the client side of the mobile application program. Other parts of a typical mobile application are the server side and networking service programs.

A system for providing the navigation management in a mobile device includes a processor, a  
20 screen for user interface, and a memory. The memory embodies a client-side program with program code for causing the processor to perform the method steps as described above.

As can be understood from these examples, by introducing the navigation capability to the system, the present invention makes the interface more user friendly. Such advantages will be appreciated by those of ordinary skill in the art from the description and practice of the invention disclosed herein.

## 25 BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention. Wherever convenient, same or similar numbers or designations are used throughout the drawings to refer to the same or like elements.

Figure 1 shows a wireless interconnection model using one of the many types of available bearer networks.

Figure 1A shows another model of interaction, via bearer networks, between 3<sup>rd</sup>-generation (3G)-enabled mobile devices and servers as well as other devices.

5 Figure 2 shows a mobile phone with features associated with the present invention.

Figure 3 illustrates the flow once users reach the Yahoo! Photos landing page.

Figures 4A-4D show the respective PC-based and mobile device-based registration and application buy flow diagrams.

Figures 5A and 5B show the screen flows for online albums and mobile albums, respectively.

10 Figure 5C, parts (i) and (ii), describes setting up favorites for the mobile album slideshow.

Figure 5D shows flow diagrams for photos view, share and save.

Figure 5E illustrates the flow of restoring the mobile album from the server backup.

Figure 6 provides a simplified diagram to illustrate the back button feature.

Figure 7 is a screen shot of a mobile album showing a list of photos and action icons at the  
15 bottom of the screen.

#### DETAILED DESCRIPTION OF THE INVENTION

The present invention contemplates a navigation pattern in a directory tree and implementation of this concept in mobile applications. One such application is mobile photos, an example of which is referred to as the Yahoo! Photos™ application. Yahoo! and Yahoo!  
20 Photos are trademarks of Yahoo! Inc., Sunnyvale, CA. Any other trademarks are the property of their respective holders.

Indeed, although it can be implemented in various applications, for clarity and for illustration, the approach contemplated by the present invention is described here in the context of the Yahoo! Photos application. Thus it is useful to provide a description of the Yahoo! photos -  
25 program in which an instance of the directory navigation is embodied. The description of this application precedes the details of the navigation to give it proper context.

The server side of this application is the "server Yahoo! Photos," and the client side of this application is the mobile client application, or "client Yahoo! Photos." A client application is generally considered to be a downloadable application; namely, J2ME™ (Java™ 2 platform, Micro Edition, by Sun Microsystems, Inc.), Yahoo! Photos™, or any other application that is  
5 downloadable to the mobile device. In the example here, the client Yahoo! Photos runs on a mobile phone, and more specifically, a mobile camera phone.

#### THE WIRELESS COMMUNICATION ENVIRONMENT

##### WIRELESS COMMUNICATION PROTOCOLS

Wireless protocols, the standards which govern communications of data between wireless  
10 devices and the Internet, utilize and support the enhanced capabilities of modern mobile wireless devices and Internet content technologies. Hypertext transfer protocol (HTTP) is an often used standard, and other standards include the Wireless Application Protocol (WAP), M-services, i-Mode and Web clipping. Although other protocols are also possible, WAP appears to provide a proper framework for the content sharing. Therefore, adoption of  
15 standards such as WAP is suitable for the purpose of the present invention, and it is discussed in some detail below.

The adoption of WAP builds on existing Internet standards and protocols adapted for use in wireless communication networks and addresses the unique characteristics of mobile wireless devices (with limited computing, memory, display, user interface, and power capabilities).  
20 WAP is a specification suite defining a set of protocols for presentation and delivery of wireless information and telephony services on mobile wireless devices. WAP services provide information access and delivery to WAP-enabled devices. WAP was designed to empower users with easy and instant access to information and interactive services. Thus, interoperability between WAP-enabled device is possible through any WAP-compliant  
25 infrastructure to deliver timely information and accept transaction and queries.

WAP can be built on any operating system, including PalmOS, EPOC, Windows CE, FLEXOS, OS/9, JAVA OS etc. Being air interface independent, WAP is designed to be scalable to new networks as they develop, allowing bearer independence and development of common solutions across disparate networks.

The term "WAP" is commonly used to refer to the wireless application environment (WAE) although it is WAE that includes the WAP suit of protocols and technologies. WAE provides the rich application environment which enables delivery of information and interactive services to mobile wireless devices. An important aspect of the WAE is the WAP stack,  
5 namely the wireless protocol layers, as shown for example in Figure 1. At the bottom of the WAP stack 11 is a network layer, topped by the transport layer, the security layer, the transaction layer, and the session layer.

Briefly, the network protocol layer supports network interface definitions, governing interface with the networks of wireless service providers (wireless bearers) such as short  
10 message service (SMS), code division multiple access (CDMA), cellular digital packet data (CDPD), general packet radio service (GPRS), high speed circuit-switched data (HSCSD), third generation (3G), GSM (global system for mobile communications), and unstructured supplementary service data (USSD) channel. The wireless transport layer supports the wireless datagram protocol (WDP), and when operating over an IP (Internet protocol)  
15 network layer WDP is replaced with user datagram protocol/IP (UDP/IP). WDP offers to the upper protocol layers a datagram service and transparent communication over the underlying bearer services. In other words, WDP offers to the upper protocol layers a common interface to and ability to function independent of the type of bearer wireless network. The wireless transport layer security (WTLS) provides a secure transport service to preserve the privacy,  
20 authentication and data integrity of the transport service at the layer below, as well as the ability to create and terminate secure connections between communicating applications. The transaction protocol (WTP) layer provides transaction oriented protocol for the WAP datagram service, including, for example, request-response transactions. The wireless session protocol (WSP) layer provides HTTP/1.1 functionality and features such as session  
25 suspend/resume. The WSP provides the upper-level application lever of the WAE with an interface to connection and connectionless services operating above the transaction protocol and the datagram transport layers, respectively.

The WAE (i.e., the wireless application environment) is further fashioned with a wireless markup language (WML) micro-browser, a WML script virtual machine, a WML script  
30 standard library, a wireless telephony application interface (TAI), and WAP content types. The WAP micro-browser, also referred to as the "WAP browser," facilitates interaction between WAP/Web applications and WAP-enabled devices. The micro-browser is a tag-

based wireless browser application supporting wireless markup language (WML), and extensible transport hyperlink markup language (XTHML). The micro-browser uses the "card" metaphor for user interface, where user interactions are split into cards. The WAP card metaphor provides a common interface to which all applications can conform, much like the desktop metaphor in PCs. The micro-browser supports user actions, defined at tree levels (deck, card, and select & link options, i.e., ACCEPT, PREV, etc.) and default tasks (PREV, NOOP, etc.). For example, a deck of cards is split into a navigation card, variables card, and input elements card. A navigation card is formed as a script encapsulated with the 'card' tags. The following example of a card includes the type of interaction (DO TYPE="ACCEPT") and link (GO URL="#eCARD").

```

<CARD>
  <DO TYPE="ACCEPT">
    <GO URL="#eCARD"/>
  </DO>
  WELCOME!
</CARD>

```

#### WIRELESS COMMUNICATION INFRASTRUCTURE

Figure 1 shows a wireless interconnection model 10 using one of the many types of available bearer networks 12. The illustrated wireless mobile devices 100 are presumed to have sufficient local memory and Internet access capability to allow a user to download programs from servers 18 through the Internet 16 (and any other network such as LAN, WAN or Ethernet network) and store them in the local memory. Thus, wireless subscribers can gain fast access to content in these or other servers via the Internet through various downloadable applications. Note that the illustrated server 18 can be the origin of downloadable programs as well as the origin, or destination, of content; although programs and content can originate at or be destined for different servers. For the purpose of this illustration, the web server 18 is the source of the Yahoo! Photos client side application as well as the source, and destination, of content, particularly photos (image data). Using the downloaded program, such as Yahoo! Photos, and with multimedia capabilities, including the ability to retrieve e-mail, and push and pull information via the Internet, network operators (or, more generally, service providers) add value propositions beyond voice or text offerings.

Indeed, with this capability, users can capture photo images in their mobile devices, store and manipulate the captured images, and upload data of the captured images to a server (e.g.,



server 18). Thus, the server 18 operates as a repository for the data of photo images, and users can download from the server to their mobile devices data of previously captured photo images, as well as store and manipulate such images. Photos resident on one mobile device can be shared with another via the server 18 and the communication network(s) 12 and 16.

5 In this wireless interconnect model, the mobile phones used to download the Yahoo! Photos client side program are WAP-enabled. As shown in Figure 1, the WAP-enabled devices 100 support the WAP protocol and the server 18 typically supports the WWW (world-wide web) protocol. In particular, the wireless application environment at the mobile device side 11 includes the micro-browser, a suite of WAP protocols at the network through session layers,  
10 and the downloadable (client-side) Yahoo! Photos application program. The micro-browser defines how WML documents and WML script applets should be interpreted and presented to the mobile device user. The Micro-browser's WTA (wireless telephone application) functionality provides call control, phone book access and messaging within WML script applets to allow selective call forwarding or other secure telephony. The wireless application  
15 environment at the server side 13 includes the server-side Yahoo! Photos in addition to a standard web browser and WWW protocol stack (HTTP and TCP/IP).

To enable web-based access to content, service providers deploy wireless data through the carrier network 12 while controlling the data communications to their subscribers and tracking the billable activity. Typically, the gateway 14 is tasked with tracking subscriber  
20 activities, controlling access and, in addition, functioning as the proxy for the mobile device 100, on the one hand, and for the server 18, on the other hand. The gateway 14 is implemented, building on standard web proxy technology, to interconnect the services offered by the wireless service providers to the HTTP protocol so as to permit access to content on the wired Internet.

25 One model of interaction between a WAP-enabled device, the WAP-enabled proxy/gateway, and the server, is the Hypertext Transfer Protocol (HTTP) 1.1 response/request transaction, where HTTP 1.1 is profiled for the wireless environment. The gateway (13 & 14) translates requests from the WAP protocol to the WWW protocol, and vice versa; translating WML/(HTML) documents to HTML/(WML), resolving domain names in URLs and  
30 providing a control point for managing access. From the WAP-enabled gateway with encoders/decoders, the URL requests or WML documents (possibly in encoded form) can be sent encoded/decoded to add security to the user interaction. Note that, unlike the flat

structure of HTML documents, WML documents are divided into a set of user interaction units, namely a deck of cards. Each user interaction unit is a card (or page), and the user can navigate between cards in one or more WML documents.

Another model of interaction between a WAP-enabled device, the WAP-enabled proxy/gateway, and the server, is the HTTP response/request transaction (protocol running on top of the Internet's TCP/IP suite of protocols). This model is appropriate for the newer WAP 2.0 (with protocol stack not shown in Figure 1). Unlike the above-mentioned, and illustrated, WAP stack 11, WAP 2.0 stack includes the IP, TCP (transmission control protocol), TLS, HTTP and WAE layers atop the network layer (all of which are profiled for wireless environment). For example, the wireless profile for the TLS protocol will permit interoperability for secure transactions.

Yet another model of interaction via bearer networks, between 3<sup>rd</sup>-generation (3G)-enabled mobile devices and servers or other devices, is shown in Figure 1A. As shown, a 3G terminal supports higher-speed, wider-band wireless cellular service communications based on various technologies, including wide code division multiple access (W-CDMA), general packet radio service (GPRS), global system for mobile communications (GSM), enhanced data rates for global evolution (EDGE), unified threat management system (UMTS), and high speed circuit switched data (HSCSD). A 3G terminal is equipped with cordless connections for local, short distance communications. The communication protocols in the 3G terminal are comparable to the open system interconnection (OSI) protocols, layered in the OSI stack.

Various services are supported by these protocols, including web browsing, short message service (SMS), multimedia messaging service (MMS), e-mail, M-commerce, real-time video, and pre-paid. The MMS, for example, is a store and forward messaging service capable of adding multimedia elements to SMS, including images, text, audio clips, and video clips. MMS is synchronized across a common timeline, rather than being discrete like e-mail and SMS; it is akin to a presentation layer over e-mail and looking like a slide show with images. On a compatible phone, the MMS message will appear with a new message alert. The picture message will open on the screen, the text will appear below the image and the sound will begin to play automatically.

Downloadable applications such as Yahoo! Photos and network games are likewise supported in the 3G terminal and interact with services such as MMS. The originator can easily create a

multimedia message, either using a built-in or accessory camera, or can use images and sounds stored previously in the phone (and possibly downloaded from a web site). However, for simplicity, the following description assumes that the mobile device is a WAP-enabled camera phone used for downloading photo applications such as the Yahoo! Photos.

5 Figure 2 shows a mobile phone 100, not necessarily associated with any particular manufacturer, but with features suitable for the purpose of the present invention. For example, to accommodate the Yahoo! Photos application, the mobile phone 100 has a camera feature with the camera lens 112 exposed for capturing images. The mobile phone 100 also has a 5-point navigation key (also called game key) 114, and it features left, right, up, down  
10 and selection, or 'OK,' functions, substantially mimicking the operations of a mouse. The main menu button 116 activates the menu display on the screen, and the main OK button 118 activates a menu selection. The 'back' button 110 is shown as a hardware key whose position here is merely exemplary. Namely, the physical placement of the 'back' button is device dependent, where it is anticipated that buttons on different devices may be arranged  
15 differently. A 'back' soft-key is possible to implement a 'back' function of the WAP browser, which means that it would show up as an icon or menu item on the screen of the mobile phone.

As further shown in Figure 2, the Yahoo!-enabled phone 100 supports wireless cellular service communications based on various technologies such as the GPRS and GSM. This  
20 device is configured for supporting WAP communication protocols (at all layers of the WAP stack). Various services shown as being supported by these protocols, include web browsing, SMS, MMS, e-mail, M-commerce, real-time video, and pre-paid. The downloadable programs shown to interact with such services include the network games and Yahoo! Photos.

25 The mobile device functionality is preferably implemented using a platform, such as the J2ME™ platform, which is tailored for a broad range of embedded devices including mobile phones. The J2ME™ platform includes a set of standard Java APIs (application programming Interface), and provides a user interface, a security model, built-in network protocols (e.g., WAP, as shown in Figure 1), and support for networked and disconnected applications  
30 (Yahoo! Photos is a networked application).

With the J2ME™ platform, applications are written once for a wide range of device. Applications leveraging each device's native capabilities are then downloaded dynamically. The J2ME™ platform defines configurations, profiles and optional packages as elements for building complete Java run time environments. Configurations are composed of a virtual machine and a minimal set of class libraries and provide the base functionality for a particular range of devices that share similar characteristics. Current configurations include connected limited device configuration (CLDC) for devices with limited memory and processing capabilities (e.g., mobile phones, two-way pagers, and PDAs) and connected device configuration (CDC) for devices with better memory, processing and network bandwidth capabilities (e.g., TV set-top boxes, residential gateways, in-vehicle telematics systems, and hi-end PDAs). However, in order to provide a complete runtime environment targeted at specific device categories, the configurations must be combined with a set of the high-level APIs, or profiles, that further define the application life cycle model, access to device-specific properties, and user interface.

One example of profiles is the mobile information device profile (MIDP) which is designed for mobile phones and entry-level PDAs. MIDP offers a core application functionality required by mobile applications, including user interface, network connectivity, local data storage, and application management. The J2ME™ can be further extended by combining various optional packages and their corresponding profiles to address specific market requirements, e.g., Bluetooth™, web services, wireless messaging, multimedia, and database connectivity.

#### THE NAVIGATION IN THE CONTEXT OF MOBILE YAHOO! PHOTOS

Note that the example here focuses on the camera phone, but the principles of the present invention are not limited to camera phones. Any phone or other wireless mobile device can embody a variation of the present invention. When the mobile device is a smart handset, downloading application programs and implementing the navigation scheme are possible even though the communications with the service provider may be different in character.

It should be mentioned that, although the manufacturer provides the Yahoo!-enabled phone 100 with camera functionality -- i.e., functionality for capturing images, and saving, displaying, manipulating, transmitting and receiving data of images -- this camera functionality is independent from the Yahoo! Photos program. That is, data of the captured

images reside in the mobile phone outside the Yahoo! Photos environment until such time that this data is introduced to the Yahoo! Photos environment by being first uploaded to the Yahoo! server and then downloaded to the local (mobile) Yahoo! Photos album, as will be later explained.

- 5 On mobile devices, various client application programs are offered to the user on a default start-up or main menu screen or on a manufacturer-installed virtual vending machine screen. Other selection items include, for example, the menu item for setting the sound. These start up and vending screens show a menu with a list (or icons) of applications which the user can obtain by following an install procedure. The menu provides links to various service web
- 10 sites, including, for example, the Yahoo! Photos site. The links, of course, are URLs (Uniform Resource Locator) -- i.e., the world wide web address of a site on the Internet, and on the Yahoo!-enabled phone, at least one such menu item is the link for downloading the Yahoo! Photos application.

- Figure 3 illustrates the flow once users reach the mobile application site, which, in this
- 15 example, is the Yahoo! Photos landing page. The URL for the landing page is obtained via a link from a promotional web page, through a web search, or from a bookmark (or favorites). The flow is shown as originating on a user's PC (personal computer) and it commences with program information presented at the landing page 302 on the PC display. The contents 303 and 304 of the landing page is presented to show the options available to the user based on
- 20 whether or not the user has already purchased the Yahoo! Photos program. For instance, the landing page presents to the user the Yahoo! Photos program name with the option of "how to get it now" 304, as well as upload information 306a, flash demo 306b, and pricing information 306d, say, "\$2.99 monthly." To buy the application the user clicks on the application name, Yahoo! Photos, or on "how to get it now." Subsequent to the registration
- 25 400<sub>A-D</sub>, a query (such as "would you like to buy it for \$2.99?") prompts the user to accept/reject the offer 320. Then, for the purpose of implementing upload security, the user is prompted to establish upload opt-in parameters 500, as will be later explained.

- If the user accepts the offer to buy the application, the order is confirmed 322 and the application is downloaded into the mobile phone, becoming resident on the mobile phone.
- 30 Figures 4A-4D show the respective PC-based and mobile-based registration and buy flow diagrams.

Incidentally, as shown in Figures 3 and 4A, if the user confirms acceptance, assuming the user has an account on the server having signed in before, the user is prompted to provide the telephone number of the mobile phone. With that phone number, the server sends a short message embedded with a link to the mobile phone and causes the mobile phone to vibrate or, otherwise, signals the user with a message requesting confirmation of the purchase 326. With this confirmation 426 the server proceeds to send the program to the mobile phone.

As shown in Figures 4B and 4C, registration can originate on the PC or the mobile phone. In the PC-based registration process, once, the compatible phone list is reviewed 450 and the phone is deemed compatible, registration can go forward starting with the user entering the 10-digit mobile phone number 452. The service provider dials the 10-digit phone number and requests confirmation from the user via that mobile phone 456. The user is also prompted to follow the buy instructions 460 or follow the link to the vending machine 458. Once the download takes place the Yahoo! Photos client home page 268 is presented on the mobile screen. Alternatively, rather than indirectly via the PC, a program such as Yahoo! Photos can be purchased directly via the mobile phone, as shown in Figure 4C. That is, the registration process originating from the mobile phone is launched from the menu page, e.g. Yahoo! home pages 470 or 472. Beyond that, the link to (virtual) vendor machine page 462, download page 464, confirmation page 466 and home page 468 are similar to those in Figure 4B.

Figure 4D shows a first-time purchase flow. As can be seen, the purchase can originate either at the PC or the mobile phone, starting with the respective landing page. Note that in the PC-based process the landing page 480 is obtained via a standard browser. In the mobile-based process, the landing page 482 presents the WAP sites, assuming the mobile phone is WAP compliant and uses the micro-browser for linking to this and subsequent pages. Then, for a first time purchaser the product information (i.e. Yahoo! Photos application) is introduced along with price and links to terms of use and buy/cancel selection buttons (icons) 486. Download activation 488, progress update 490 and confirmation 492 are provided along the way when the application is loaded. The application is then ready to launch on exiting the micro-browser 494. After being invoked, the home page of Yahoo! Photos is displayed 498.

Once the Yahoo! Photos program is resident on the mobile phone it can be invoked from the landing page or menu page (using the menu button on the phone to bring up the menu or using the default menu if Yahoo! Photos is presented as one of the default menu options).

Invocation of the Yahoo! Photos application allows, among others, user access and manipulation of the user's mobile album as well as online albums in the user account. Figures 5A and 5B show the screen flows for online albums and mobile albums, respectively.

Invocation of Yahoo! Photos prompts this program to display the 'home' page 2.0 with two  
5 main options: mobile album, and online album (as shown in Figures 6A and 6B). The mobile album is an album of photos stored locally on the mobile phone, so that the user need not go out over the network to obtain them. The online album is an album of photos stored on the server in the user's account. As mentioned before, photo images can be captured and manipulated by the mobile phone outside the Yahoo! Photos environment. These photo  
10 images will not be available at the mobile or online albums until they are uploaded to the server, stored in the online album and then (selectively or in batch) downloaded to the mobile album, and vice versa. Accordingly, selecting 'online album' allows the user to access and manipulate photo images that have already been uploaded to the server from the user's PC or mobile phone and stored in the online album. Likewise, selecting 'mobile album' allows the  
15 user to access and manipulate photo images that have been already downloaded from the server into the mobile album.

Then, if the 'online album' option is selected from the Yahoo! Photos client program 'home' page (2.0), as shown in Figure 5A, it prompts the program to display the next page which is the 'sign-in' page (1.0). It requires the user to follow a sign-in procedure that typically  
20 includes providing a Yahoo! ID and user password. The sign-in procedure will, among others, bring up the user's account and relate it to the user's online albums. That is, the sign-in procedure allows the user to access his account via the Internet (and other proprietary network if applicable).

The next page is the 'my online albums' page (2.1). For the specific user, this online albums  
25 page lists the names of photo albums available to the named user which are associated with the user's account. Of course, only albums that are on the server are listed, and if the selected album is empty the next page will display an indication to that effect (i.e., "this album is currently empty" at page; 2.1.6). Alternatively, if the album is not empty, selecting that album will bring up the next page, the 'photo list' page for that album (2.1.2). In the 'photo  
30 list' page, a photo can be selected for downloading it from the server onto the mobile phone. Additionally, a selected photo can be opened or other actions can be invoked in relation to it. The other actions are presented in a menu that is shown on the screen as a pull-down menu,

pop-up menu, or a menu superimposed on any part of the current page (in this example the menu is shown as a pull-down menu).

Such menu (hereafter "photo options menu") provides a number of selection items, each of each representing an action, including: 'save to mobile,' 'email photo,' 'screen saver,'

5 'thumbnails,' 'online albums,' and 'home.' Each selection brings up a page that corresponds to the selected action item. Two of the action items have already been discussed above, 'home' and 'online album.' Selecting home, will lead the user back to the home page (2.0), and selecting online album, will lead the user to the aforementioned 'my online albums' page (2.1).

10 Selecting 'thumbnails' brings up a 'photo thumbs' page 2.1.1 that shows a group of thumbnail photo images from the selected album. Note that the number of photo thumb groups downloaded from the server depends on the memory size of the mobile phone (or whatever device is used). With this feature, the user can then thumbnail through the groups of photos in the album. The groups of thumbnail photo images in this album are each loaded  
15 from the server. The user can then move between the images back and forth (scroll back and forth) and select any one of the photos in the 'thumbnails' page. A selected thumbnail image will be enlarged in the next page, the 'online photo' page (2.1.3).

As can be seen, each of the pages, 'photo list' (2.1.2), 'photo-thumbs' (2.1.1), and 'online photo' (2.1.3), includes the photo options menu feature. Among these action items, when  
20 'save to mobile' is invoked from the 'photo list' page, 'photo thumbs' page, or 'online photo' page, it causes the selected photo image (previously downloaded from the server) to be saved in the mobile album on the mobile phone. The 'added to mobile' page (2.1.7) is brought up in this case to show the photo being saved and to give an indication that saving is done.

When 'email photo' action is invoked, the 'share as email' page comes up (2.1.5). This page  
25 shows the photo(s) selected for emailing and prompts the user for the email address. In this implementation, a number of recently-used email addresses are provided. Incidentally, 'email' is simply a transport mechanism which is presently used to send photos from camera phones. Other transport mechanisms may be developed and employed for this application. Then, when the photo is emailed from the mobile phone to the selected e-mail address, a  
30 message pops up indicating that the email has been sent or, if not, that an error occurred. For example, a transmission will fail if the user is not authorized to upload photos to the selected



e-mail. An error message of this kind is a product of the upload security scheme in the Yahoo! Photos application program.

When the 'screen saver' action is invoked, the selected photo will be used to populate the screen when the phone is idle, standing by, or starting up. The 'screen saver' option is  
5 associated with screen saver page (2.1.4) which shows the selected photo and requires the user to select 'OK' or 'cancel' to add this photo to the screen saver photo roster. A message pops up to indicate the status of the photo download.

Going back to the mobile album is possible with the photo options menu via the 'home' page, using the 'home' option as discussed above. Another way for getting to the mobile album or  
10 any other previous page is with the "back" action using the 'back' button, as will be later explained. Also, as mentioned above, when the Yahoo! Photos application is invoked from the landing/menu page, the 'home' page (2.0) presents the 'mobile album' as one of the selection items. Accordingly, the mobile album can be directly accessed via the 'home' page.

The mobile album screen flow, shown in Figure 5B, starts with the 'home' page (2.0) and  
15 selection of the mobile album brings up the 'mobile photo' list page (3.1.1). This page presents two action menus, 'open' and 'action.' Thus, selection of any of the listed photos can be followed by selecting 'open' or 'action.' As before, when 'open' is selected the photo is shown on the screen in the 'photo thumbs' page (3.1.2). When 'actions' is selected, a mobile photo action menu is provided. This menu includes action items such as 'slide show,' 'move,'  
20 'delete photo,' 'delete all' (photos), 'thumbnails,' 'history,' and 'home.'

Except for the photos being local (at the mobile album), the thumbnails feature, associated with the 'photo thumbs' page (3.1.2), works as described above with reference to the online album. A photo selected on the mobile 'photo thumbs' page can be enlarged as shown in the next page, the 'mobile photo' page (3.1.3). The menu for the 'photo thumbs' and 'mobile  
25 photo' pages includes a subset of the aforementioned mobile photo action menu.

When the slide show is invoked from such a menu the 'mobile slide show' page comes up (3.3). While this feature is active, the slide show will scroll through the mobile album photos, showing each photo for a certain period. The slide show will go on until the user selects  
30 'stop' on the bottom of the page. If the user selects 'actions' a slide show menu gives the user the options of 'pause,' 'show,' 'normal,' and 'fast.' The 'pause' option is selected for pausing the slide show; 'slow' will slow down the slide show, 'speed' will speed up the slide

show, and 'normal' will bring it to normal speed. (Figure 5C, parts (i) and (ii), describes setting up favorites for the mobile album slideshow; part (i) describes the process in the mobile device, and part (ii) describes the process originating at the PC).

As further shown in Figure 5B, the 'move' page comes up (3.2.1) when the 'move' action (referred to also as 'rearrange' action) is selected from any one of the three pages (3.1.1, 3.1.2 and 3.1.3). In this page, the program displays a group of photos (thumbnails) and the user can rearrange the photos using the 5-point navigation key, as well as choose to drop a photo or save it (Figure 5D shows flow diagrams for photos view, share and save). When the 'delete' or 'delete all' actions are selected, the user has the option of deleting or canceling the delete action (as shown in pages 3.2.5 and 3.2.4). The 'delete' page shows the photo selected for deletion to allow the user to change their mind. When all the photos are deleted, or when the mobile album is empty to begin with, the 'mobile album empty' page is displayed (3.1.4). It allows the user to select the home page or select the answer to any one of the queries, such as "where are my photos?" and "what is the mobile album?." Selection of the latter will bring up the 'about' page (3.1.4.1), and in this page pressing 'OK' provides user access to the online album(s). Selection of the former brings up the 'restore album' page 3.1.4.2. The "restore" function is explained in more detail below.

Note that, when the user signs in, the server associates the user's identification with his historical record so that the application program can record (backup) the photo in the server each time the user saves a photo to the mobile album. This historical record serves as a backup that allows the user to restore his album if the Yahoo! Photos program is erased, for any reason, from the mobile phone memory and the user then reloads this program. This history feature is useful to reduce the navigation for restoring the mobile album since the server maintains this information in the user's client account.

It is important to note that although the history feature is described in the context of the Yahoo! Photos program, it is useful in any mobile device application where backup is desired. Thus, although this feature is implemented for the Yahoo! Photos application, it can be implemented more generically for other applications.

In the Yahoo! Photos context, every photo from the user's online album that is saved to the mobile album is 'remembered' by the server. Preferably, since the page traversal path is not predictive the history is recorded accurately and fully. This is made possible with the

association of the user's Yahoo! ID to a user's historical record on the server that records all photos saved by the user to the mobile album. Moreover, since each mobile phone device is distinct, and a user may have more than one device, each device can in principle have its own distinct historical record. However, it can be arranged when the user first establishes or later updates his account that the user's Yahoo! ID is associated with a plurality of mobile phones and, upon signing in, the user can have access to his historical record from any one of these mobile phones. Thus, in a situation where the Yahoo! Photos program is deleted somehow or photos in the mobile album are erased for some reason the historical record provides a mobile album backup for restoring that album.

10 To that end, when the user reloads the application, it will query the user as to whether the user wishes to restore any of the mobile album photos. That is, when the user selects the query "where are my photos?" (in page 3.1.4) the 'restore album' page is displayed (3.1.4.2). As with the previous page (3.1.4), this page allows the user to go to the 'home' page (2.0) and, this time via 'OK', it allows the user to go to the next mobile 'restore album' page

15 (3.1.4.2.1) for a historical photo download list (of photos previously downloaded to the mobile phone).

Figure 5E illustrates in more detail the flow of restoring the mobile album from the server backup. Specifically, after traversing the 'home' and 'mobile album empty' pages (2.0 and 3.1.4), the user lands on the 'restore album' page (3.1.4.2). On selecting the 'OK' option, if

20 the user is logged in the Yahoo! Photos server responds with the download history list of photos (steps 33, 35). This response prompts the mobile device to bring up the 'restore album' page (3.1.4.2.1) with the download history list of, say, 20 last photos that were added to the mobile album. From this historical list, the photos can be picked (see, e.g., checkmarks) and then the selected photos can be restored to the mobile album using the

25 save/cancel menu options. The selected photos are then downloaded from the server in a batch process (step 37). The mobile album is then available for user access via 'mobile album' page (3.1.1).

Note that the pages shown in Figures 5A-5E and discussed herein are exemplary rather than exhaustive, and they do not necessarily include all possible pages (or user interaction cards)

30 that a photo application such as Yahoo! Photos presents. Moreover, the reference designations (call-out numbers) typically refer to the pages themselves rather than any portion of their content. Where applicable, similar pages appear in different figures with the

same call-out numbers, e.g., home page 2.0, although their respective contents can vary slightly.

As to navigating through the pages on the mobile phone, the pages can be traversed forward as described above and they can be traversed backwards using the "back button" feature.

- 5 Figure 6 provides a simplified diagram to illustrate the "back button" feature. As can be seen, the "back a level" mode allows hierarchical backwards sequence traversal one level each time the 'back' button is touch activated or clicked (hereafter "clicked"). The "back in sequence" mode allows sequential backwards one page each time the 'back' button is pressed. For example, in back a level mode, back a level takes the application from a photo page (e.g., 6)
- 10 one level up to the list of photos page (3); and from there one more level up to the list of albums page (2) and one more level up to the home page (1). As can be further seen in this example, the back in sequence mode functions to take the application from the current photo page (6) to the former photo page (5), rather than up one level (3), when the back button is touched. Additional activations of the back button will traverse through all the pages in
- 15 reverse sequence.

It makes no difference if the "back button" feature is used while in the online album or mobile album part of the application. The principles apply equally well to both situations. Either way, the steps (pages traversed) are remembered, and they can be recorded server side, locally, or both on the server side and locally.

- 20 Notably, while the "back button" feature provides backwards traversal through pages as described above the navigation feature as described in more detail below provides up-down traversal within these pages, particularly photo pages. For the type of navigation which involves up-down traversal within the aforementioned pages the relevant and effective method involves collapsing and expanding and following the hierarchy presented in these
- 25 pages.

- Because mobile devices typically have limited display size and an awkward navigation mechanism, this type of navigation pattern improves the user interface in the context of mobile application. Moreover, with this type of navigation there is room left for an action menu or action icons that are context specific. Therefore, this directory navigation feature
- 30 addresses the challenge of navigating a directory tree while simultaneously providing multiple context sensitive action choices for a selected item.

To that end, the directories are structured as well as presented in a tree-like hierarchical format. For example, in mobile photos application such as the client Yahoo! Photos, the directory is the mobile albums. In other possible implementations, the directory points to the mobile albums. Either way, the directory is structured as a tree-like hierarchy. In the

5 hierarchical tree-shaped directory each item is a node. In the context of the client Yahoo! Photos application, a node is, an item in the mobile albums list. In this context, the directory navigation employs node collapsing and expansion. For each node, the state of either expanded or collapsed is remembered so that when the very same node is clicked, the right action can be taken accordingly. Clicking on the node functions as a toggle between the

10 collapsed and expanded states.

The following example of collapsing and expansion will make it clearer. When the directory (hierarchical tree-shaped directory of nodes) is displayed it essentially take the following exemplary form:

15                   + aphotos  
                  + animals  
                  + my garden  
                  + my kids

Clicking 'aphotos' album expands that node to provide the a list of items in that node. Figure 7 is a screen shot of a mobile album showing a list of photos along with action icons (at the

20 bottom of the screen). The list of photos includes, for example:

                  - aphotos  
                    alex.jpg  
                    alhambra.jpg  
                    derrick&Kevin.jpg  
25                   greece.jpg  
                    more.....  
                  + animals  
                  + my garden  
                  + my kids

30 Clicking 'aphotos' album again collapses that node back to:

                  + aphotos  
                  + animals  
                  + my garden  
                  + my kids

35 Then, as further shown, when an item within a directory tree is chosen, action icons are graphically presented. These icons are provided for users to take actions specific to the selected item. For example, the first icon on the left allows the user to bring up the selected

photo. Also, if the number of icons exceeds the space limit of the screen the left/right arrows allow the user to scroll left or right to reveal additional icons of action choices. The number of action icons is determined by the nature of the item selected. Preferably, only actions that apply to the item are made available. This, of course, saves space on the screen. Thus, in view  
 5 of the above, the navigation scheme improves user interface.

### IMPLEMENTATION DETAILS

Additional implementation details associated with the foregoing description are provided below. These implementation details include an initial list of devices, soft key mapping, labels, global elements and screen flows tables for the online albums and mobile albums.  
 10 These details are described in the following pages.

### POSSIBLE MOBILE DEVICES

The visual and interaction design as described herein should accommodate various types of mobile devices, including, for example, those listed in the table below.

VENDOR	MODEL	USABLE PIXEL DIMENSIONS
Audiovox	8450	128 x 112
Samsung	A660	128 x 146 (without Soft key) 128 x 131 (with Soft key: 15)
Sanyo	RL2000 (7200)	120 x 112 (include soft key)
Sanyo	RL2500 (5400)	132 (W) x 160 (H) including Soft key
Sanyo	5500	132(w) x 160(h) including Soft key
Sony Ericsson	T608	128 x 114 pixels
Toshiba	9950	261 x 240
Hitachi	SH-P300	120w x 130h
LG	5350	120x96
Samsung	A500	128 x 146 (without Soft key) 128x131 (with Soft key:15)
Samsung	N400	128 x 114 (without Soft key) 128x102 (with Soft key:12)
Samsung	A600	128 x 146 (without Soft key) 128 x 131 (with Soft key: 15)
Samsung	VGA1000 (A620)	128 x 146 (without Soft key) 128 x 131 (with Soft key:15 )
Sanyo	4900	120 x 112 includes Soft key
Sanyo	5300	132x160 (includes soft key)
Sanyo	8100	128 x 120 (with soft key) 120 x 112 (without Soft key)

### SOFT KEY MAPPING

15 For the purpose of this invention, the following keys are available on the mobile devices: Up; Down; Left; Right; Select/OK; Left Soft key; Right Soft key; and Back. If a device does not have an obvious select key, it is assumed that the MIDP (mobile information device profile)

implementation will automatically provide a select option at one of the soft keys or in one of the soft key menus.

KEY MAPPING	
Up	Scrolls the cursor up, or selects the previous item in a list.
Down	Scrolls the cursor down, or selects the next item in a list.
Left	Scrolls the cursor left if possible.
Right	Scrolls the cursor right if possible.
Select	<p>LINK OR BUTTON: Go to appropriate screen</p> <p>EXCLUSIVE LIST (Radio buttons): Selects the radio button.</p> <p>MULTIPLE LIST (Checkboxes): Checks and un-checks the checkboxes.</p> <p>TEXTBOX: Takes the user to the text editor</p> <p>TEXT STRING: Does nothing</p>
Two Soft keys	<p>Soft key functionality varies greatly among devices. The ordering and positioning of options can't be controlled with any degree of accuracy; the order shown indicates only the relative importance of the options.</p> <p>In the examples presented herein, options are assigned a type (BACK, EXIT, ITEM)</p> <p>The following layout is preferred:</p> <p>Item 1: primary soft key</p> <p>Item 2: If no others are present, secondary soft key should have item 2 as its label. If additional items are available they should be listed in priority order in the menu, which is accessed via the secondary soft key.</p> <p>Primary soft key should have the same function as the 'Enter'/'OK' key</p>
Back	<p>'Back' button links back to previous screen.</p> <p>Does NOT link one level up in the navigation tree, unless that is the previous screen.</p> <p>Does not link back to confirmation or error popups.</p> <p>When technical constraints exist, data previously entered into fields may not be shown when user navigates back to a page. However, actual implementations may differ based on the technical constraints.</p>
Default Selection	In general, the first item on a page is pre-selected (default item) unless the user has performed some action, like viewing or renaming an image.
Misc. keys	<p>If arrow buttons on the side of the phone are available they should scroll down an entire page in a list or thumbnail screen.</p> <p>Image names should appear bold/strong when displayed on an instructional screen, e.g. 2.1.4. Normal text should be used for lists of images.</p> <p>In this document any underlined item is a link. Actual presentation of links, whether underlined or other, is determined by the device.</p>

#### SOFT KEY & MENU LABELS

In a representative implementation, labels that may appear on a soft key are restricted to 7

5 characters. Menu-only items are restricted to 14 characters.

COMMON LABELS

OK	Performs the default action for a screen or for a selected item. Moves the user forward in a task. (e.g., opens an album or photo.)
Cancel	Used in addition to "Back" when an action was initiated and can be cancelled. Cancel usually performs same action as back, but is displayed to increase user confidence that the action was cancelled.
Edit	When possible, "Edit" links to a textbox editing screen.
Open	Opens a folder, message, file, etc. Should not be used for links not associated with files, folders, etc.
Back	"Back" label should be used only for the Back function described above. If possible, Back should always map only to the device back button.
Home	Links to the home screen of the MIDlet.

GLOBAL ELEMENTS

## CONFIRMATION POPUP

One type of global elements, presented as "Confirm Popup" screens, are used for displaying a confirmation to the user. The confirmation popup screens contain simple text such as "Done" or "Saved", and they disappears automatically after a short time.

IN PROGRESS SCREEN

The "in progress" screen informs the user that the application is waiting for a response from the server or is processing a request. Each device has a default screen with text and a moving graphic, and, alternatively, it is replaced with a Yahoo! Canvas screen.

SCREEN FLOWS: ONLINE ALBUMS

As described above, the online album pages are made available to the user in forward and backwards traversal; each page having default selection items associated with it. The forward traversal starts, of course, with the home page (2.0). The following tables outline for each page separately the default selection items available in that page for screen flows.



2.0 J2ME Client Home					
Default Selection	Mobile Album				
Actions	Label	Function	Pref. Location	Type	Priority
		Left soft key opens selected page. Numbers 1, 2, 3, 4 also open	Primary Soft key, OK Button	ITEM	1
Enter/OK	Open				
Up Arrow	Select previous item				
Down Arrow	Select next item				
Left Arrow	Select next item				
Right Arrow	Select previous item				
Comments	Descriptive text and/or graphics will be added to this screen. Icons may be used in place of text links. "Sign Out" appears only when user is signed in.				

1.0 Sign In					
Default Selection	ID Field.				
Actions	Label	Function	Pref. Location	Type	Priority
	Edit	Opens selected textbox for editing	Primary Soft key, OK Button	EDIT	1
	SignIn	Submits Form	Secondary Soft key	OK	1
	Back	2.0 J2ME Client Home	Back	BACK	1
Up Arrow	Jumps up.				
Down Arrow	Jumps down.				
Left Arrow	-				
Right Arrow	-				
Comments	Cache as much as legally & technically possible.				

2.1 My Online Albums					
Default Selection	First Album, or last selected album in current session.				
Primary Soft key	Open. Same as Enter.				
Actions	Label	Function	Pref. Location	Type	Priority
	Open	Opens selected album to last-used view- 2.1.1 or 2.1.2. List is default.  If album contains no images, opens 2.1.6 Photos List Empty.	Primary Soft key, OK Button	ITEM	1
	Back	Previous screen.	Back	BACK	1
Up Arrow	Jumps to previous item in list. If top item is selected, does nothing.				
Down Arrow	Jumps to next item in list. If last item is selected, does nothing.				
Left Arrow	-				
Right Arrow	-				

2.1.1 Photos Thumbs						
Default Selection	<p>One thumbnail is always selected. Selection is indicated by 2 pixel black border.</p> <p>When scrolling to a page either (1) or (4) is selected.</p> <p>When returning from a list view, full-screen view, or action screen the last selected image is selected.</p>					
Actions	Label	Function	Pref. Location	Type	Priority	
	Open	Opens 2.1.3 Online Photo NOTE: pressing 1,2,3, or 4 opens the photo currently in that position.	Primary Soft key, OK Button	ITEM	1	
	Add to Mobile Album	Saves image to mobile album and opens 2.1.7 Added to Mobile	Menu	ITEM	2	
	Screen Saver	Links to 2.1.4 Save as Screensaver	Menu	ITEM	3	
	Email Photo	Links to 2.1.5 Share as Email	Menu	ITEM	3	
	Photo List	Links to 2.1.2 Photo List	Menu	SCREEN	1	
	Online Albums	Links to 2.1 My Online Albums	Menu	SCREEN	2	
	Home	Links to 2.0 J2ME Client Home	Menu	SCREEN	3	
	Back	Previous screen	Back button	BACK	1	
Up Arrow	<p>When (3) or (4) is selected, jumps up to (1) or (2).</p> <p>When (1) or (2), moves up one row.</p>					
Down Arrow	<p>When (1) or (2) is selected, jumps down to (3) or (4).</p> <p>When (3) or (4), moves down one row.</p>					
Left Arrow	Cycle through all thumbs on the screen, (4)-(1) then to the row above. Rows are added one at a time, so the top row shifts down when a new row is loaded.					
Right Arrow	Cycle through all thumbs on the screen, (1)-(4) then to the row below. Rows are added one at a time, so the bottom row shifts up when a new row is loaded.					
Comments	<p>List loops back to beginning when user reaches last image. When looping to the beginning, the full screen refreshes with 2 rows of images.</p> <p>Each photo is surrounded by 2 pixels of white space. The selected photo has a 2 pixel black border.</p>					

2.1.2 Photo List					
Default Selection	<p>One item is always selected.</p> <p>When returning from a thumbnail view, full-screen view, or action screen the last selected image is selected.</p> <p>After deleting, the image in the spot that contained the deleted image is selected.</p>				
Actions	Label	Function	Pref. Location	Type	Priority
	Open	Opens 2.1.3 Online Photo	Primary Soft key, OK Button	ITEM	1
	Add to Mobile Album	Saves image to mobile album	Menu	ITEM	2
	Screen Saver	Links to 2.1.4 Save as Screensaver	Menu	ITEM	3
	Email Photo	Links to 2.1.5 Share as Email	Menu	ITEM	3
	Thumbnails	Links to 2.1.1 Photo Thumbs	Menu	SCREEN	1
	Online Albums	Links to 2.1 My Online Albums	Menu	SCREEN	2
	Home	Links to 2.0 J2ME Client Home	Menu	SCREEN	3
	Back	Previous screen	Back	BACK	1
Up Arrow	Jumps to previous item in list. If top item is selected, does nothing.				
Down Arrow	Jumps to next item in list. If last item is selected, does nothing.				
Left Arrow	-				
Right Arrow	-				
Comments	<p>File extensions are displayed.</p> <p>Items are displayed in order specified by the Yahoo! Photos system.</p> <p>User cannot rename, delete, or move photos.</p>				

2.1.3 Online Photo					
Default Selection	-				
Actions	Label	Function	Pref. Location	Type	Priority
	Done	Links to 2.1.1 or 2.1.2	Primary Soft key	SREEN	1
	Add to Mobile Album	Saves image to mobile album	Menu	ITEM	2
	Screen Saver	Links to 2.1.4 Save as Screensaver	Menu	ITEM	3
	Email Photo	Links to 2.1.5 Share as Email	Menu	ITEM	3
	Online Albums	Links to 2.1 My Online Albums	Menu	SCREEN	2
	Home	Links to 2.0 J2ME Client Home	Menu	SCREEN	3
	Back	Previous screen	Back	BACK	1
Up Arrow	-				
Down Arrow	-				
Left Arrow	Jumps to previous image in gallery.				
Right Arrow	Jumps to next image in gallery.				
Comments	Image should be as large as possible on any particular screen.				

2.1.4 Save as Screensaver					
Default Selection	Text entry field				
Actions	Label	Function	Pref. Location	Type	Priority
	OK	Initiates PCS Vision download process.	Primary Soft key, OK Button	SCREEN	1
	Cancel	Cancels operation and returns to previous screen	Second Soft key	SCREEN	2
	Back	Previous screen	Back	BACK	1
Up Arrow	-				
Down Arrow	-				
Left Arrow					
Right Arrow					
Comments					

2.1.5 Share as Email					
Default Selection	Text entry field				
Actions	Label	Function	Pref. Location	Type	Priority
	Send	Send. Sends email to recipients and user with link to image on web. Confirmation pops up for a moment, then user is returned to 2.1.1, 2.1.2, or 2.1.3. If email address was not formed correctly an error appears.	Secondary Soft key	ITEM	1
	Edit/Pick/OK	Opens textbox for editing, toggles state of checkbox, or sends.	Primary Soft key, OK Button		1
	Back	Previous screen	Back	BACK	1
Up Arrow	-				
Down Arrow	-				
Left Arrow	-				
Right Arrow	-				
Comments					

2.1.6 Photo List Empty					
Default Selection					
Actions	Label	Function	Pref. Location	Type	Priority
	Back	2.1 My Online Albums	Back	BACK	1
Up Arrow	-				
Down Arrow	-				
Left Arrow	-				
Right Arrow	-				
Comments	Displayed for a moment, then automatically links back to 2.1 My Online Albums				

SCREEN FLOWS: MOBILE ALBUM

As with the online album, the mobile album pages are made available to the user in forward and backwards traversal; each page having default selection items associated with it. Here again, the forward traversal starts, of course, with the home page (2.0). The following tables  
 5 outline for each page separately the default selection items available in that page for screen flows.

3.1.1 Mobile Photo List					
Default Selection	One item is always selected. When returning from a thumbnail view, full-screen view, or action screen the last selected image is selected. After deleting, the image in the spot that contained the deleted image is selected.				
Actions	Label	Function	Pref. Location	Type	Priority
	Open	Opens selected photo in 3.1.3 Mobile Photo	Primary Soft key, OK Button	ITEM	1
	Slideshow	Links to 3.3 Mobile Slideshow, starting show with current photo	Menu	ITEM	2
	Move	Links to 3.2.1 Move	Menu	ITEM	4
	Delete	Links to 3.2.4 Delete	Menu	ITEM	4
	Thumbnails	Links to 3.1.1 Mobile-Photo Thumbs	Menu	SCREEN	1
	Home	Links to 2.0 J2ME Client Home	Menu	SCREEN	2
	Back	Previous screen	Back	BACK	1
Up Arrow	Jumps to previous item in list. If top item is selected, does nothing.				
Down Arrow	Jumps to previous item in list. If last item is selected, does nothing.				
Left Arrow	-				
Right Arrow	-				
Comments	File extensions are not displayed.				

3.1.2 Mobile Photo Thumbs					
Default Selection	<p>One thumbnail is always selected. Selection is indicated by 2 pixel border.</p> <p>When returning from a list view, full-screen view, or action screen the last selected image is selected.</p> <p>After deleting, the image in the spot that contained the deleted image is selected.</p> <p>After Moving, the last moved image is selected.</p>				
Actions	Label	Function	Pref. Location	Type	Priority
	Open	Opens 3.1.3 Mobile Photo NOTE: pressing 1,2,3, or 4 opens the photo currently in that position.	Primary Soft key, OK Button	ITEM	1
	Slideshow	Links to 3.3 Mobile Slideshow, starting show with current photo	Menu	ITEM	2
	Move	Links to 3.2.1 Move	Menu	ITEM	4
	Delete	Links to 3.2.4 Delete	Menu	ITEM	4
	Photo List	Links to 3.1.1 Mobile- Photo List	Menu	SCREEN	1
	Home	Links to 2.0 J2ME Client Home	Menu	SCREEN	2
	Back	Previous screen	Back	BACK	1
Up Arrow	<p>When (3) or (4) is selected, jumps up to (1) or (2).</p> <p>When (1) or (2), moves up one row.</p>				
Down Arrow	<p>When (1) or (2) is selected, jumps down to (3) or (4).</p> <p>When (3) or (4), moves down one row.</p>				
Left Arrow	<p>Cycle through all thumbs on the screen, (4)-(1) then to the row above. Rows are added one at a time, so the top row shifts down when a new row is loaded.</p>				
Right Arrow	<p>Cycle through all thumbs on the screen, (1)-(4) then to the row below. Rows are added one at a time, so the bottom row shifts up when a new row is loaded.</p>				
Comments	<p>List loops back to beginning when user reaches last image. When looping to the beginning, the full screen refreshes all 4 images.</p> <p>When an image is deleted all other images move to fill the empty space</p> <p>Each photo is surrounded by 2 pixels of white space. The selected photo has a 2 pixel border.</p>				



3.1.3 Mobile Photo					
Default Selection	-				
Actions	Label	Function	Pref. Location	Type	Priority
	Done	Album. Links to most recent view of album - 3.1.1 or 3.1.2 – with most recently viewed image selected.	Primary Soft key, OK Button	ITEM	1
	Slideshow	Links to 3.3 Mobile Slideshow, starting show with current photo	Menu	ITEM	2
	Move	Links to 3.2.1 Move	Menu	ITEM	4
	Delete	Links to 3.2.4 Delete	Menu	ITEM	4
	Home	Links to 2.0 J2ME Client Home	Menu	SCREEN	2
	Back	Previous screen	Back	BACK	1
Up Arrow	-				
Down Arrow	-				
Left Arrow	Jumps to previous image in gallery. When first image is reached, loops to end.				
Right Arrow	Jumps to next image in gallery. When last image is reached, loops to beginning.				
Comments	Image should be as large as possible on any particular screen .				

3.1.4 Mobile Album Empty					
Default Selection	My Online Albums				
Actions	Label	Function	Pref. Location	Type	Priority
	OK		Primary Soft key, OK Button	ITEM	1
	Back	Previous screen	Back	BACK	1
Up Arrow	-				
Down Arrow	-				
Left Arrow	-				
Right Arrow	-				
Comments					

3.1.4.1 Mobile- About					
Default Selection	My Online Albums				
Actions	Label	Function	Pref. Location	Type	Priority
	OK	Links to 2.1 My Online Albums	Primary Soft key, OK Button	ITEM	1
	Back	Previous screen	Back	BACK	1
Up Arrow	-				
Down Arrow	-				
Left Arrow	-				
Right Arrow	-				
Comments					

3.1.4.2 Mobile- Restore Album Info					
Default Selection	My Online Albums				
Actions	Label	Function	Pref. Location	Type	Priority
	OK	Links to 3.1.4.2.1 Restore Album Mobile	Primary Soft key, OK Button	ITEM	1
	Back	Previous screen	Back	BACK	1
Up Arrow	-				
Down Arrow	-				
Left Arrow	-				
Right Arrow	-				
Comments					

3.1.4.2.1 Restore Mobile Album					
Default Selection					
Actions	Label	Function	Pref. Location	Type	Priority
	Pick	Toggles state of checkbox	Primary Soft key, OK Button	ITEM	1
	Save	Downloads all selected images to Mobile Album	Secondary Soft key	SCREEN	1
	Back	Previous screen	Back	BACK	1
Up Arrow	Jumps to previous item in list. If top item is selected, does nothing.				
Down Arrow	Jumps to next item in list. If last item is selected, does nothing.				
Left Arrow	May toggle state of checkbox.				
Right Arrow	May toggle state of checkbox.				
Comments	This screen lists a close approximation of the items downloaded to a particular phone using a particular account. When the user has selected the photos he wishes to restore and presses "Save" all the images are downloaded to the mobile album. If the Mobile Album already has photos in it, restored photos are added at the bottom of the list.				

3.2.1 Move					
Default Selection	Selected Photo				
Actions	Label	Function	Pref. Location	Type	Priority
	Done	Drops photo in current location. Links to 3.2.1 with moved photo selected.	Primary Soft key, OK Button	OK	1
	Back	Links to previous page (before move command was selected) and cancels	Back button	BACK	1
Up Arrow	When (3) or (4) is selected, swaps with (1) or (2). When (1) or (2) is selected, moves up one row.				
Down Arrow	When (1) or (2) is selected, swaps with (3) or (4). When (3) or (4) is selected, moves down one row.				
Left Arrow	When (1) is selected, jumps to previous screen and swaps with (4) on that screen. When (2) is selected, swaps with (1). When (3) is selected, swaps with (2).				

	When (4) is selected, swaps with (3). When first image is selected, jumps to last image.
Right Arrow	When (4) is selected, jumps to previous screen and swaps with (1) on that screen. When (3) is selected, swaps with (2). When (2) is selected, swaps with (3). When (3) is selected, swaps with (4). When final image is selected, jumps to first image.
Comments	Small arrow images overlaid on the image being moved.

3.2.4 Delete					
Default Selection	-				
Actions	Label	Function	Pref. Location	Type	Priority
	Delete	Deletes photo and returns user to 3.1.1 or 3.1.2 (last used) with image in position of deleted image selected.	Primary Soft key	OK	1
	Cancel	Cancels deletion and links to previous screen	Secondary Soft key	BACK	2
	Back	Cancels deletion and	Back	BACK	1
Up Arrow	-				
Down Arrow	-				
Left Arrow	-				
Right Arrow	-				
Comments					

3.2.4 Delete All					
Default Selection	-				
Actions	Label	Function	Pref. Location	Type	Priority
	Delete	Deletes all photos and returns user to 3.1.4 Mobile Album Empty.	Primary Soft key	OK	1
	Cancel	Cancels deletion and links to previous screen	Secondary Soft key	BACK	2
	Back	Cancels deletion and	Back	BACK	1
Up Arrow	-				

Down Arrow	-
Left Arrow	-
Right Arrow	-
Comments	

3.3 Mobile Slideshow					
Default Selection	-				
Actions	Label	Function	Pref. Location	Type	Priority
	Stop	Ends slideshow and returns user to 3.1.1 or 3.1.2 (last used).	Primary Soft key	OK	1
	Pause	Pauses slideshow and switches first Action to "Play." Pressing again re-starts slideshow from the current image.	Menu	SCREEN	1
	Slow	Switches speed to Slow.	Menu	SCREEN	2
	Normal	Switches speed to Normal.	Menu	SCREEN	3
Up Arrow	-				
Down Arrow	-				
Left Arrow	Jumps to previous image. Slideshow continues to play at same speed.				
Right Arrow	Jumps to next image. Slideshow continues to play at same speed.				
Comments	Image should be as large as possible on any particular screen. If possible, backlight should remain on until slideshow is stopped. Screen should not refresh while Actions menu is open. The screen has no header.				

Although the present invention has been described in accordance with the embodiments shown, variations to the embodiments would be apparent to those skilled in the art and those variations would be within the scope and spirit of the present invention. Accordingly, it is intended that the specification and embodiments shown be considered exemplary only, with a true scope of the invention being indicated by the following claims and equivalents.

## WHAT IS CLAIMED IS:

1. A method for managing navigation in mobile devices, comprising:  
providing user interface in a mobile device;  
5 constructing a directory as a tree-shaped hierarchy of nodes;  
providing the directory such that any node on the directory is selectable by a user via  
the user interface, whereby navigation can flow up-down through the directory;  
associating a state and one or more action items with each node;  
saving the state of each node, the state being an expanded or collapsed condition of  
10 the node, wherein if the state of a particular node is expanded additional nodes at a lower  
level of the hierarchy are presented to the user, otherwise if the state is collapsed only that  
particular node is presented and the other nodes are hidden; and  
for any node selected by the user providing in the user interface its associated one or  
more action items.  
15
2. A method as in claim 1, wherein the directory is a mobile album.
3. A method as in claim 2, wherein the nodes in the tree-shaped hierarchy include a root  
node and any number of child nodes, and wherein any node that is childless is a leaf node  
20 which in the mobile album is a photo.
4. A method as in claim 1, wherein for any node that is selected by the user, the one or  
more action items associated with that node are action choices provided in the user interface  
either as icons or as menu items.  
25
5. A method as in claim 1, wherein for any node selectable by the user during the up-  
down navigation the number of action items associated with such node is determined by its  
nature, there being provided only action items that apply to such node.
- 30 6. A method as in claim 5, further comprising providing overflow indicators when the  
number of these action items exceeds a maximum number of action items that fit in the user  
interface, wherein the overflow indicators enable the user to scroll back a forth through all  
these action items.

7. A method as in claim 1, wherein, initially, a visible part of the directory provided to the user includes a top level of the tree-shaped hierarchy of nodes in a collapsed state, but as selected ones of these nodes are toggled they are expanded and more nodes, at a lower level of the hierarchy, are made visible and when toggled again these higher-level nodes are again collapsed.
8. The method of claim 1, wherein the mobile device is a wireless device.
9. A computer readable medium embodying a computer program with program code for managing navigation in mobile devices, comprising:
- program code for providing user interface in a mobile device;
  - program code for constructing a directory as a tree-shaped hierarchy of nodes;
  - program code for providing the directory such that any node on the directory is selectable by a user via the user interface, whereby navigation can flow up-down through the directory;
  - program code for associating a state and one or more action items with each node;
  - saving the state of each node, the state being an expanded or collapsed condition of the node, wherein if the state of a particular node is expanded additional nodes at a lower level of the hierarchy are presented to the user, otherwise if the state is collapsed only that particular node is presented and the other nodes are hidden; and
  - program code for providing in the user interface for any node selected by the user its associated one or more action items.
10. A computer readable medium as in claim 9, wherein the directory is a mobile album.
11. A computer readable medium as in claim 10, wherein the nodes in the tree-shaped hierarchy include a root node and any number of child nodes, and wherein any node that is childless is a leaf node which in the mobile album is a photo.
12. A computer readable medium as in claim 9, wherein for any node that is selected by the user, the one or more action items associated with that node are action choices provided in the user interface either as icons or as menu items.

13. A computer readable medium as in claim 9, wherein for any node selectable by the user during the up-down navigation the number of action items associated with such node is determined by its nature, there being provided only action items that apply to such node.

5 14. A computer readable medium as in claim 13, further comprising program code for providing overflow indicators when the number of these action items exceeds a maximum number of action items that fit in the user interface, wherein the overflow indicators enable the user to scroll back a forth through all these action items.

10 15. A computer readable medium as in claim 9, wherein, initially, a visible part of the directory provided to the user includes a top level of the tree-shaped hierarchy of nodes in a collapsed state, but as selected ones of these nodes are toggled they are expanded and more nodes, at a lower level of the hierarchy, are made visible and when toggled again these higher-level nodes are again collapsed.

15

16. The computer readable medium of claim 9, wherein the mobile device is a wireless device.

17. A system for providing management of navigation in a mobile device, comprising:  
20 a processor;  
a screen for user interface; and  
a memory embodying a client-side program with program code for causing the processor to perform steps, including:  
providing the user interface;  
25 constructing a directory as a tree-shaped hierarchy of nodes;  
providing the directory such that any node on the directory is selectable by a user via the user interface, whereby navigation can flow up-down through the directory;  
associating a state and one or more action items with each node;  
30 saving in the memory the state of each node, the state being an expanded or collapsed condition of the node, wherein if the state of a particular node is expanded additional nodes at a lower level of the hierarchy are presented to the user, otherwise if the state is collapsed only that particular node is presented and the other nodes are hidden; and



for any node selected by the user providing in the user interface its associated one or more action items.

18. A system as in claim 17, wherein the directory is a mobile album.

5

19. A system as in claim 18, wherein the nodes in the tree-shaped hierarchy include a root node and any number of child nodes, and wherein any node that is childless is a leaf node which in the mobile album is a photo.

10 20. A system as in claim 17, wherein for any node that is selected by the user, the one or more action items associated with that node are action choices provided in the user interface either as icons or as menu items.

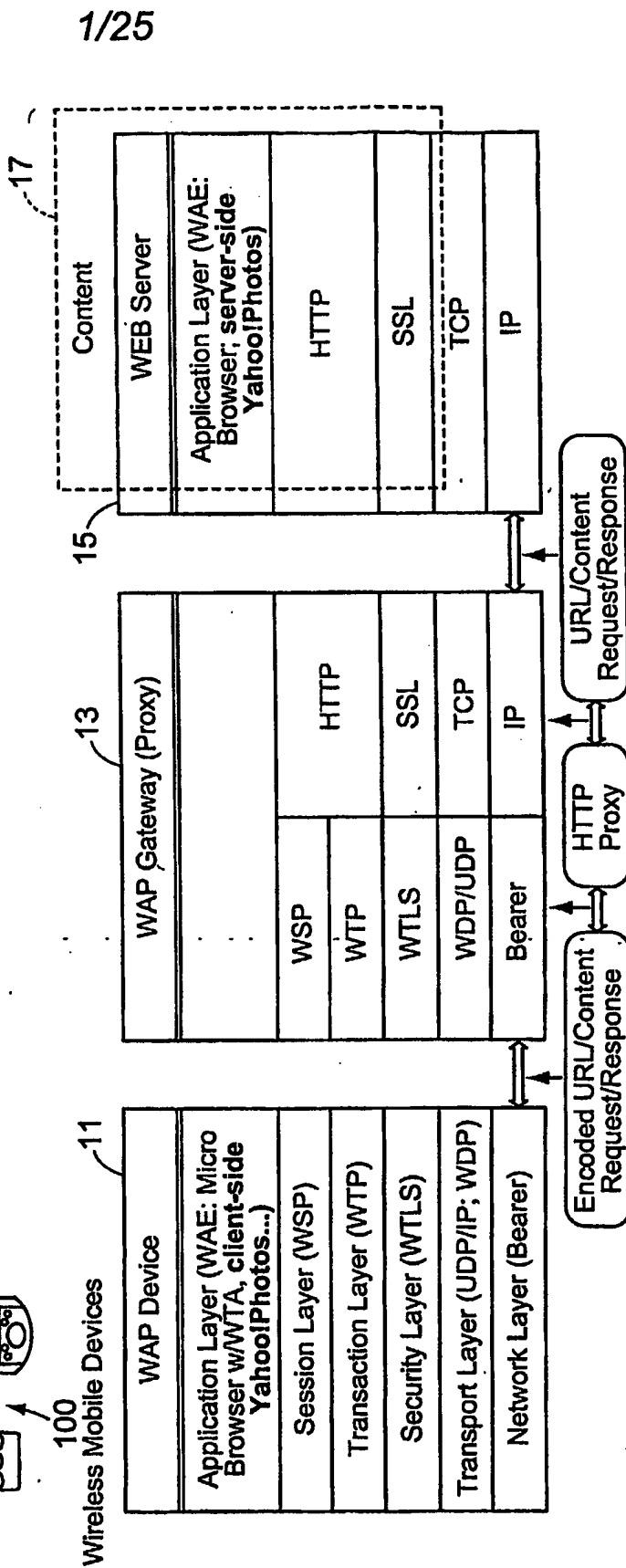
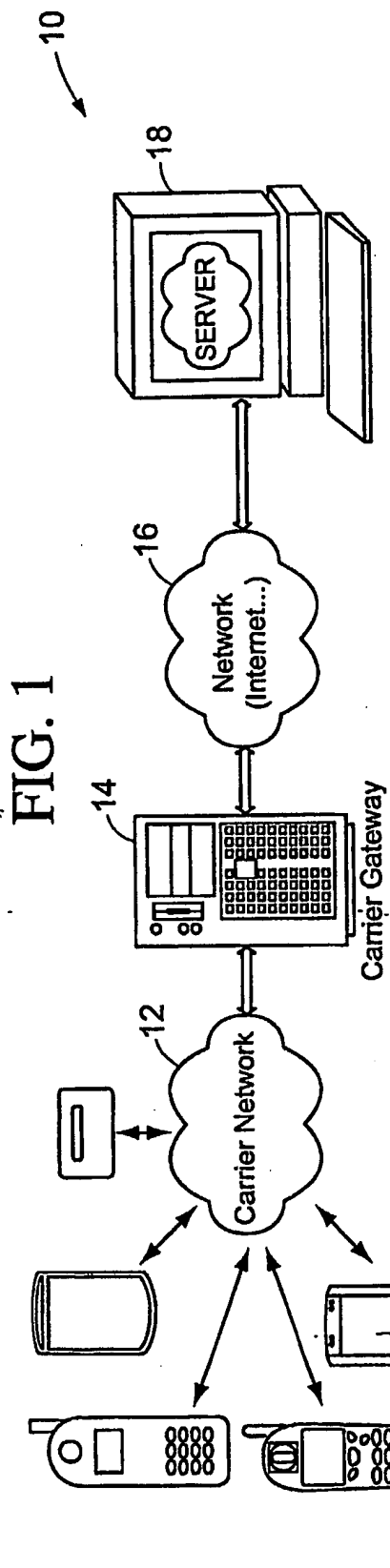
15 21. A system as in claim 17, wherein for any node selectable by the user during the up-down navigation the number of action items associated with such node is determined by its nature, there being provided only action items that apply to such node.

22. A system as in claim 21, wherein the client-side program has further program code for causing the processor to perform the further step of providing overflow indicators when the  
20 number of these action items exceeds a maximum number of action items that fit in the user interface, wherein the overflow indicators enable the user to scroll back a forth through all these action items.

23. A system as in claim 17, wherein, initially, a visible part of the directory provided to  
25 the user includes a top level of the tree-shaped hierarchy of nodes in a collapsed state, but as selected ones of these nodes are toggled they are expanded and more nodes, at a lower level of the hierarchy, are made visible and when toggled again these higher-level nodes are again collapsed.

30 24. The system of claim 17, wherein the mobile device is a wireless device.

25. The system of claim 17, wherein the mobile device is a wireless camera phone.



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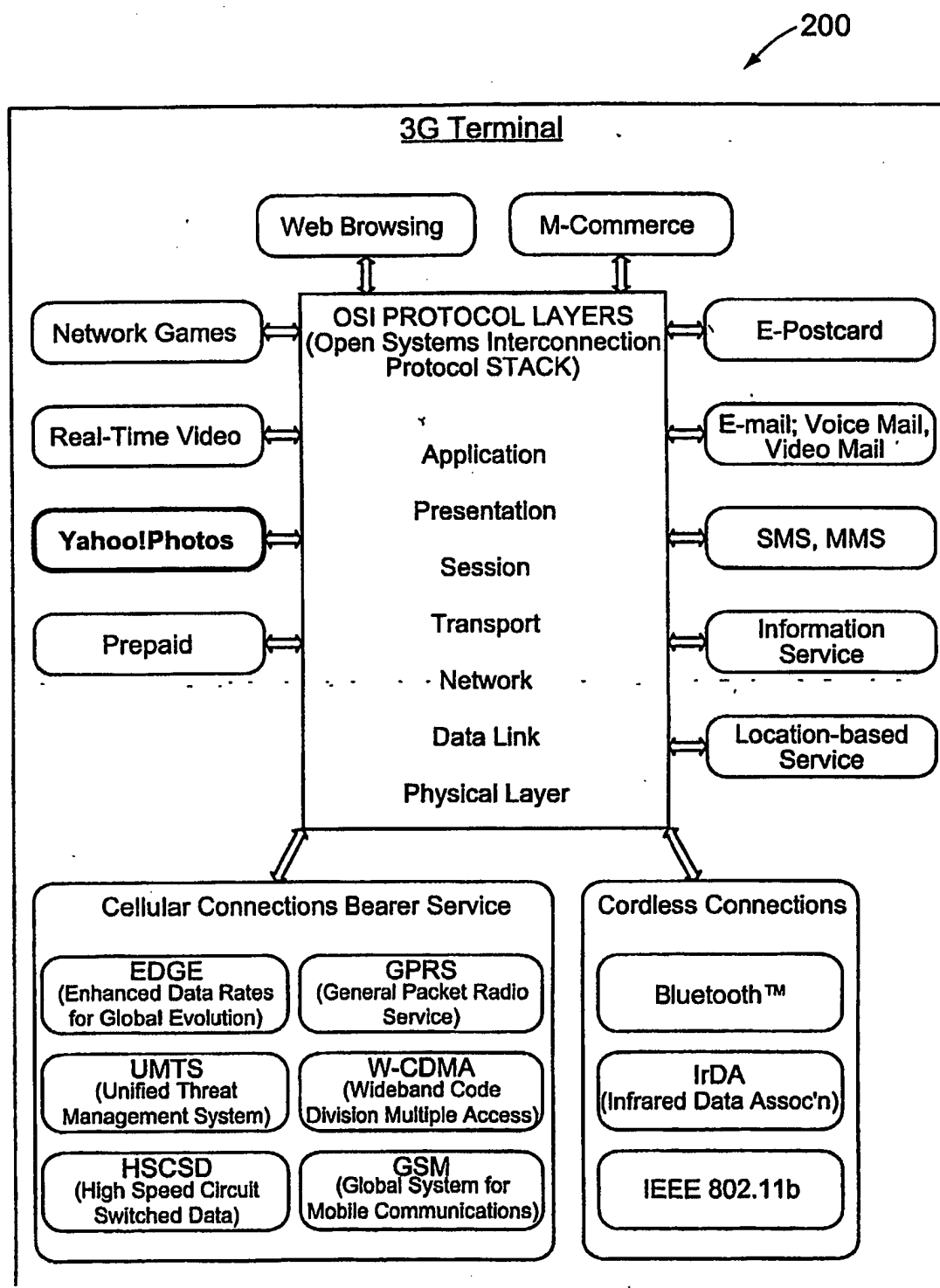


FIG. 1A

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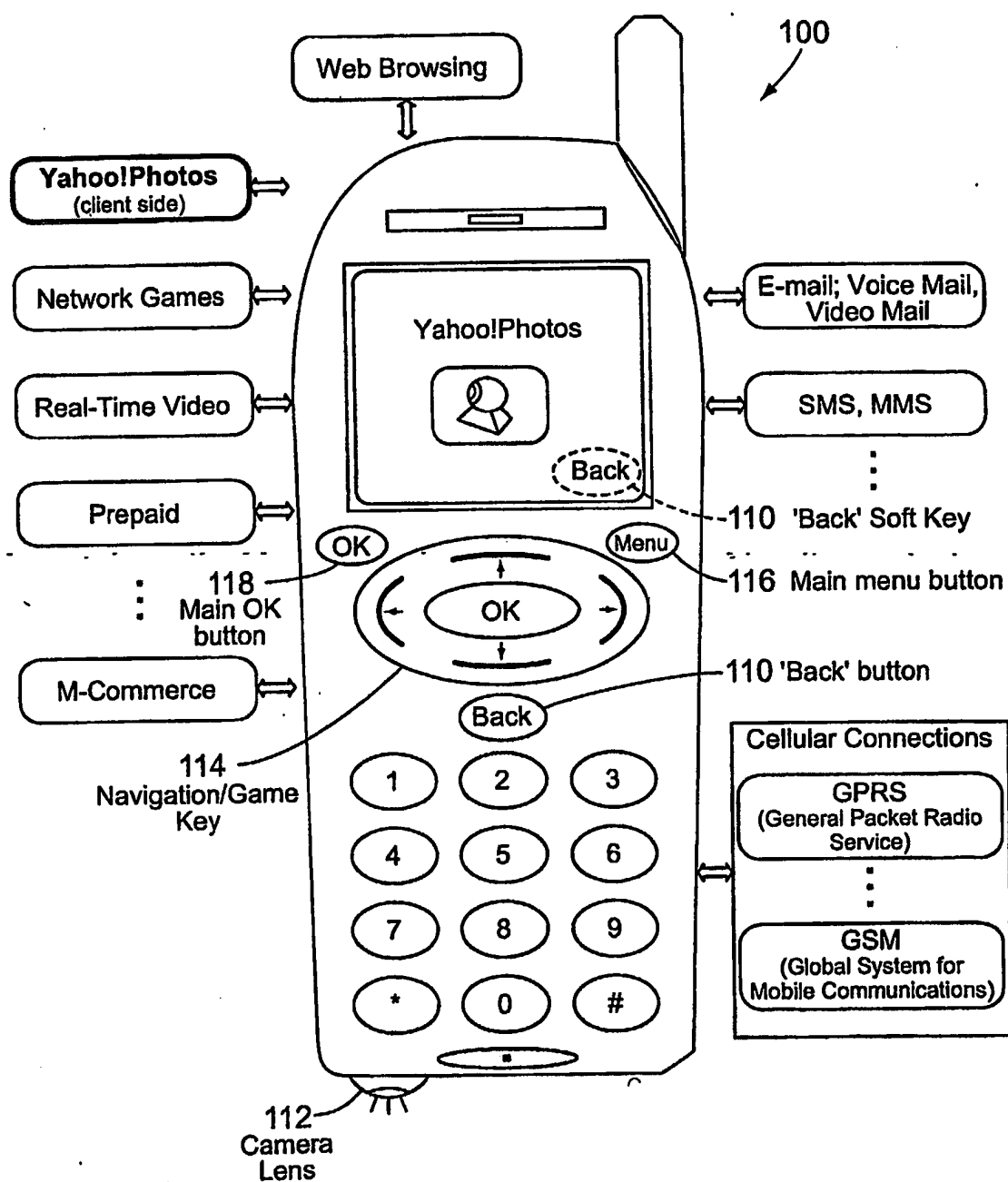


FIG. 2

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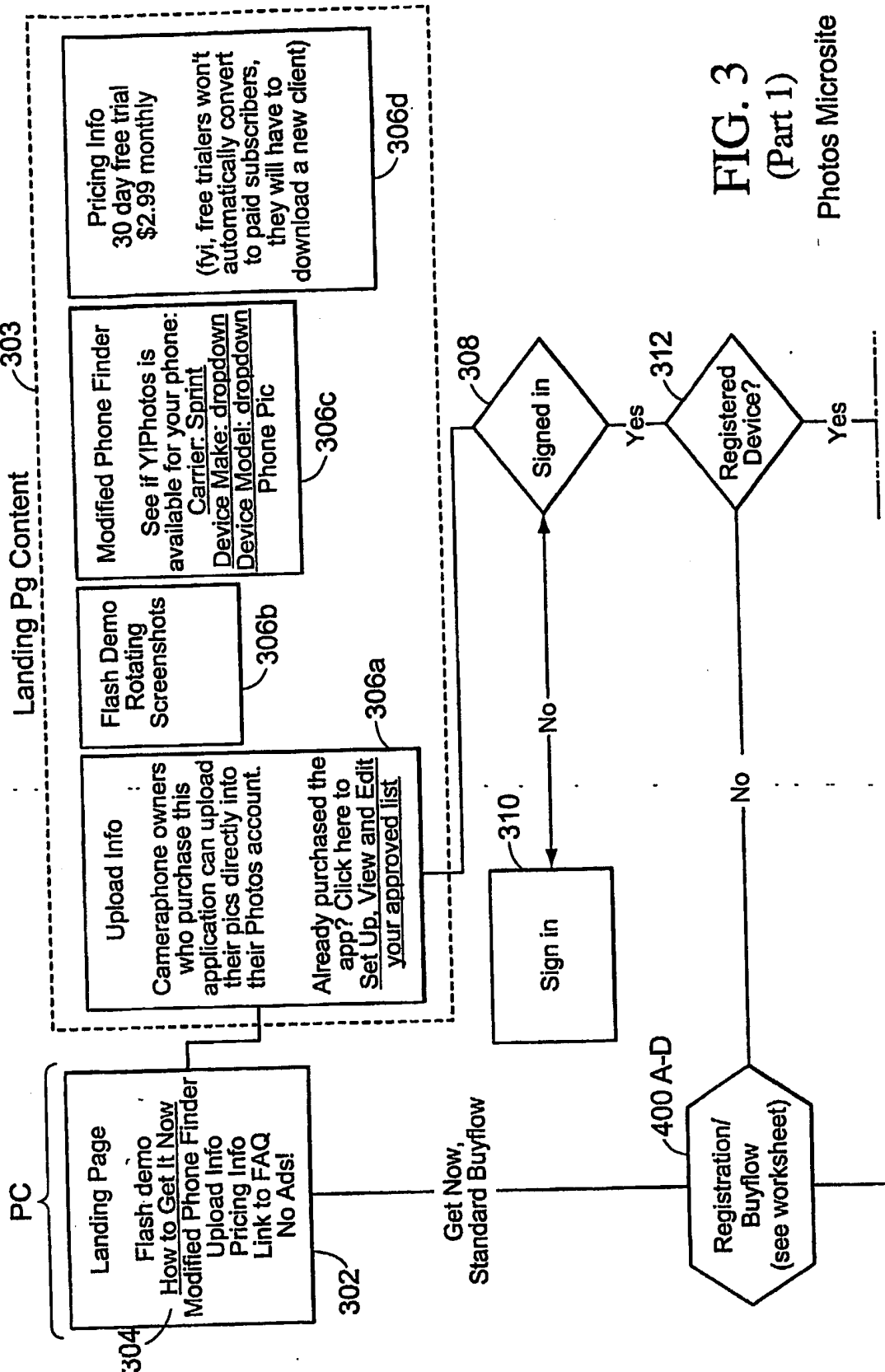
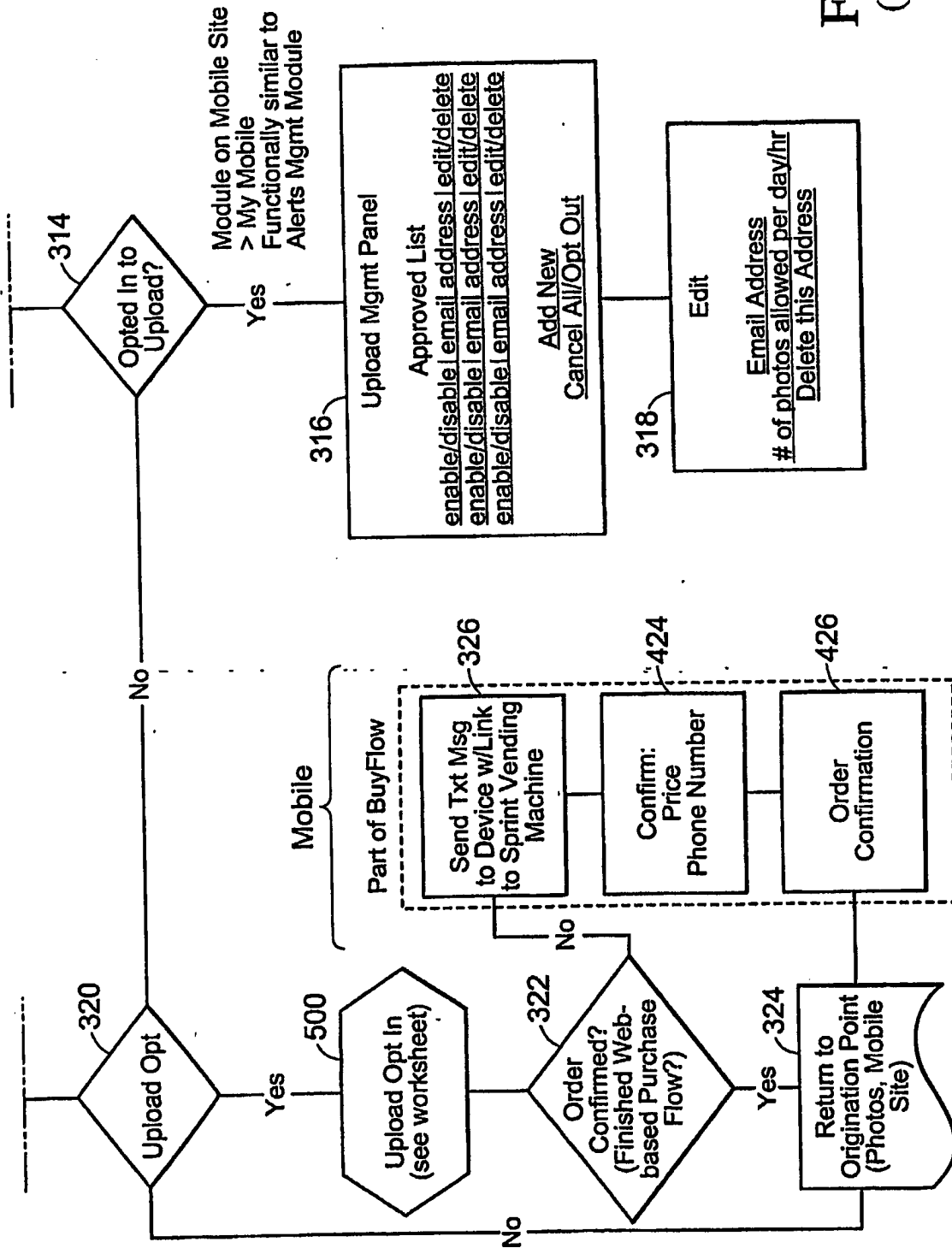


FIG. 3  
(Part 1)

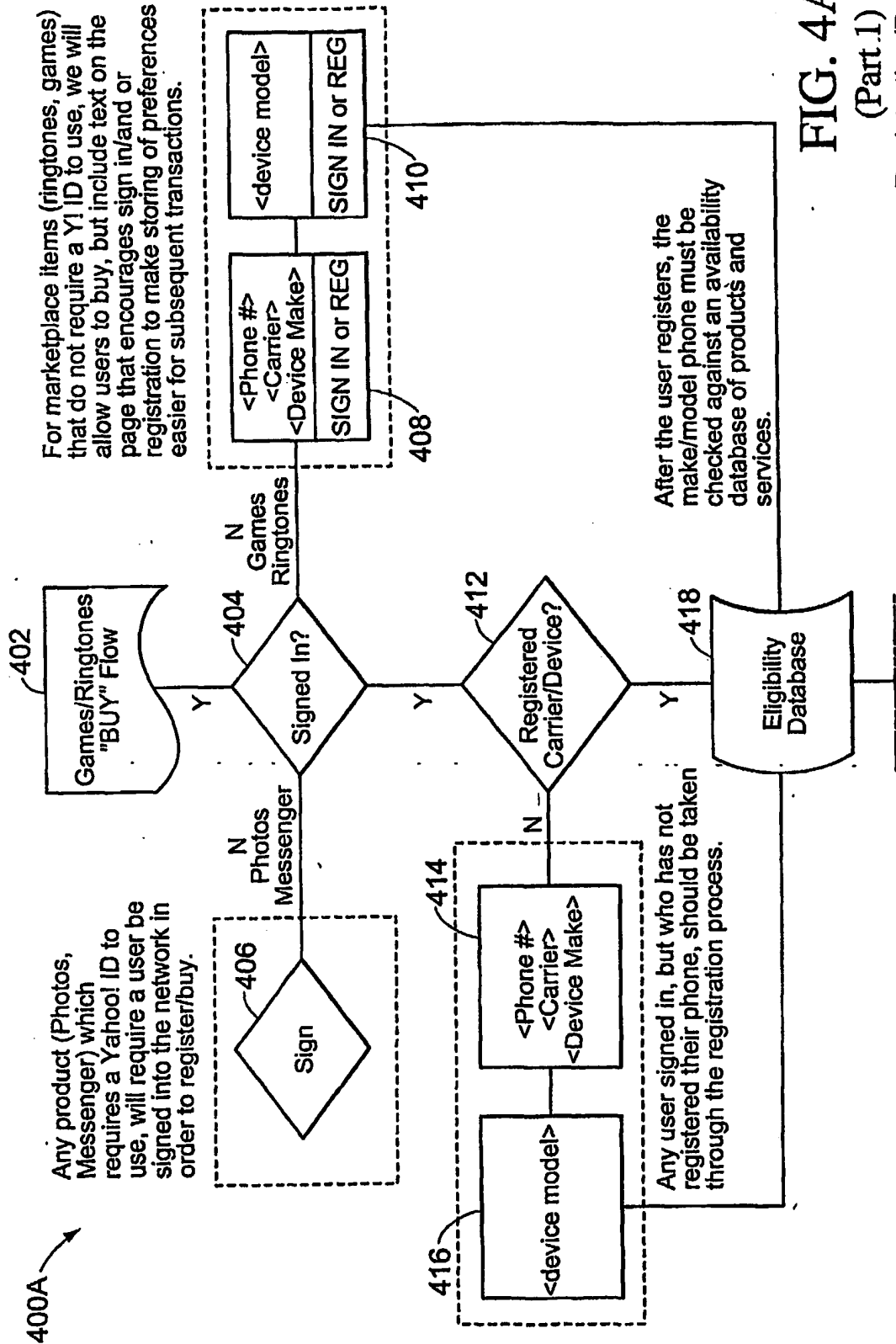
Photos Microsite

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FIG. 3  
(Part 2)



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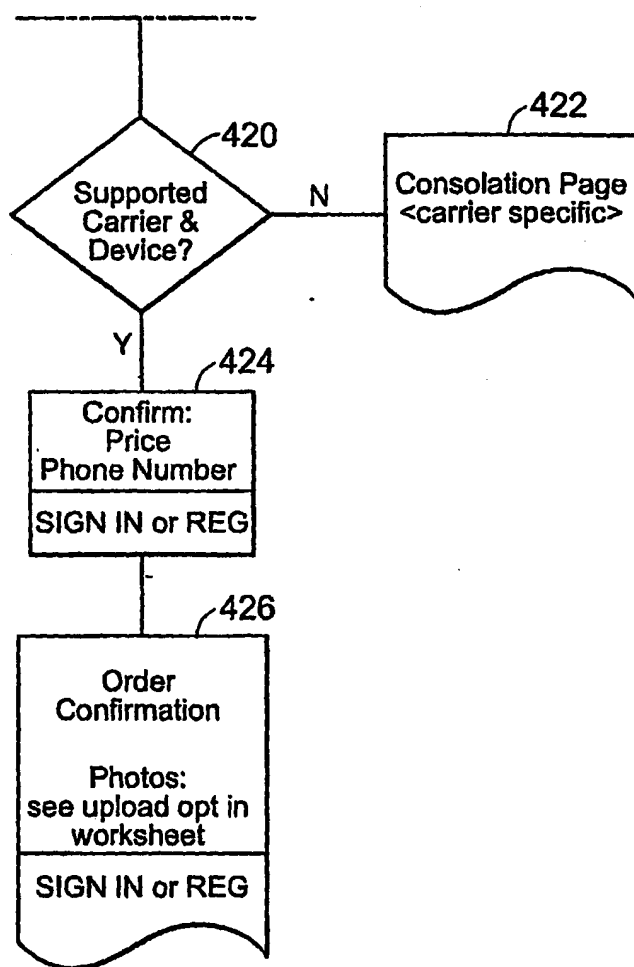
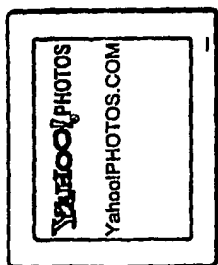


FIG. 4A  
(Part 2)



Registration Process: PC



400B

452

**Registration**  
(Signed In Y! User)

Registration in 3 easy steps.  
You will need a compatible  
mobile phone to complete  
registration

**Step 1**  
Enter your 10 digit mobile  
number: 408-555-1212

Select your carrier  
(dropdown only contains  
Sprint)

**OK**

450

Compatible  
Phone  
Device List

454

**Registration Step 2: Confirmation**

Please confirm that all information  
is correct. If there are mistakes,  
please click your browser's "back"  
button to get to the page  
containing the incorrect data.

Name: Y! username  
Email Address: Y! email  
Password: \*\*\*\*\*  
Provider: Sprint PCS  
Mobile Phone Number:  
408-555-1212

456

**Registration Step 3:  
Confirmation Message**

We sent a message to your  
phone at (408) 555-1212.  
Once you receive the message  
please click on your phone  
below for specific instructions  
on how to complete the  
registration process.

If you do not receive this  
message within the next 10  
minutes, please click here to  
re-send the message

Compatible Phone Device List  
(1 image per device w/link to  
device specific instruction  
popup)

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FIG. 4B  
(Part 1)

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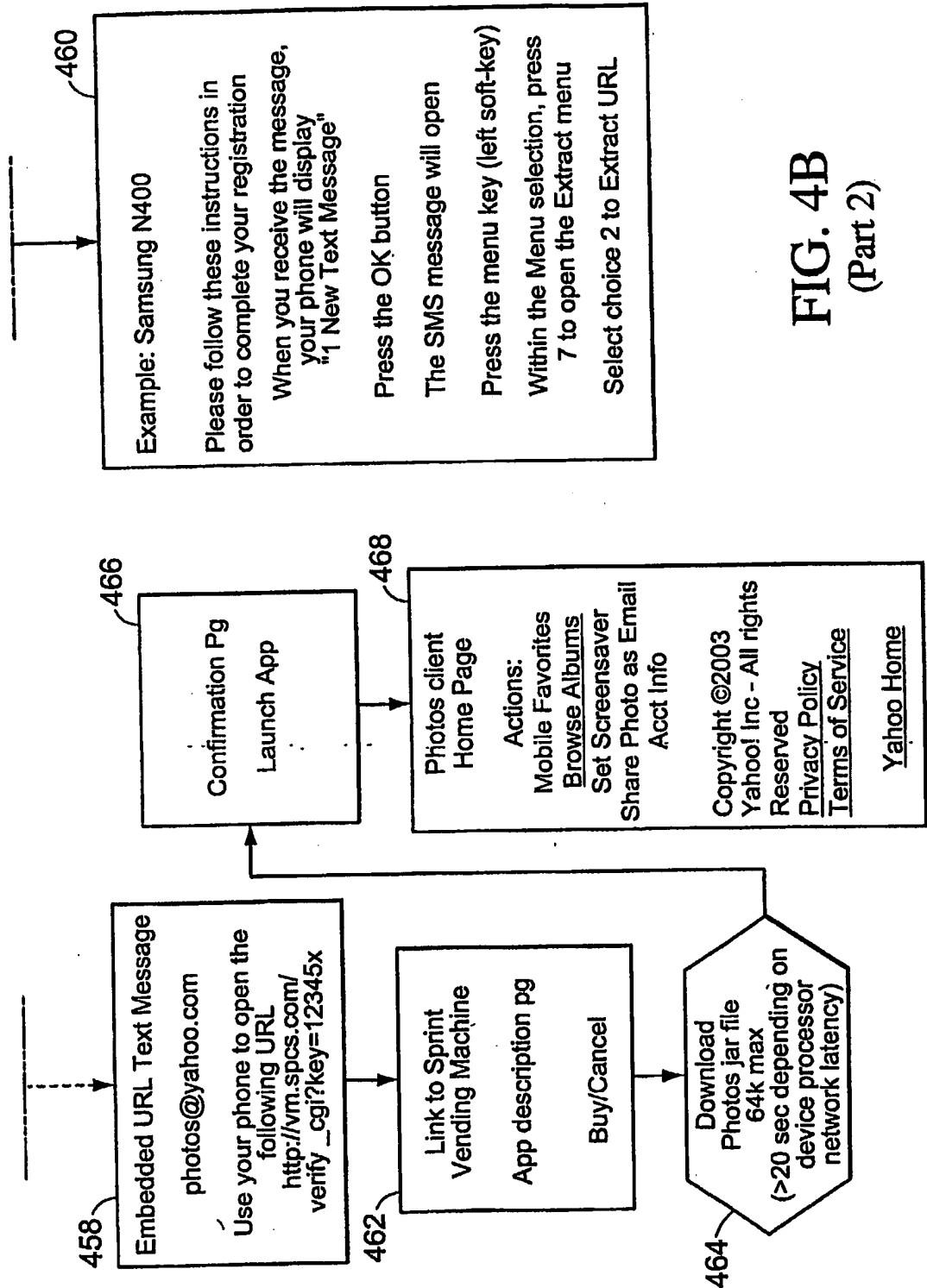


FIG. 4B  
(Part 2)

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## Registration Process: Device

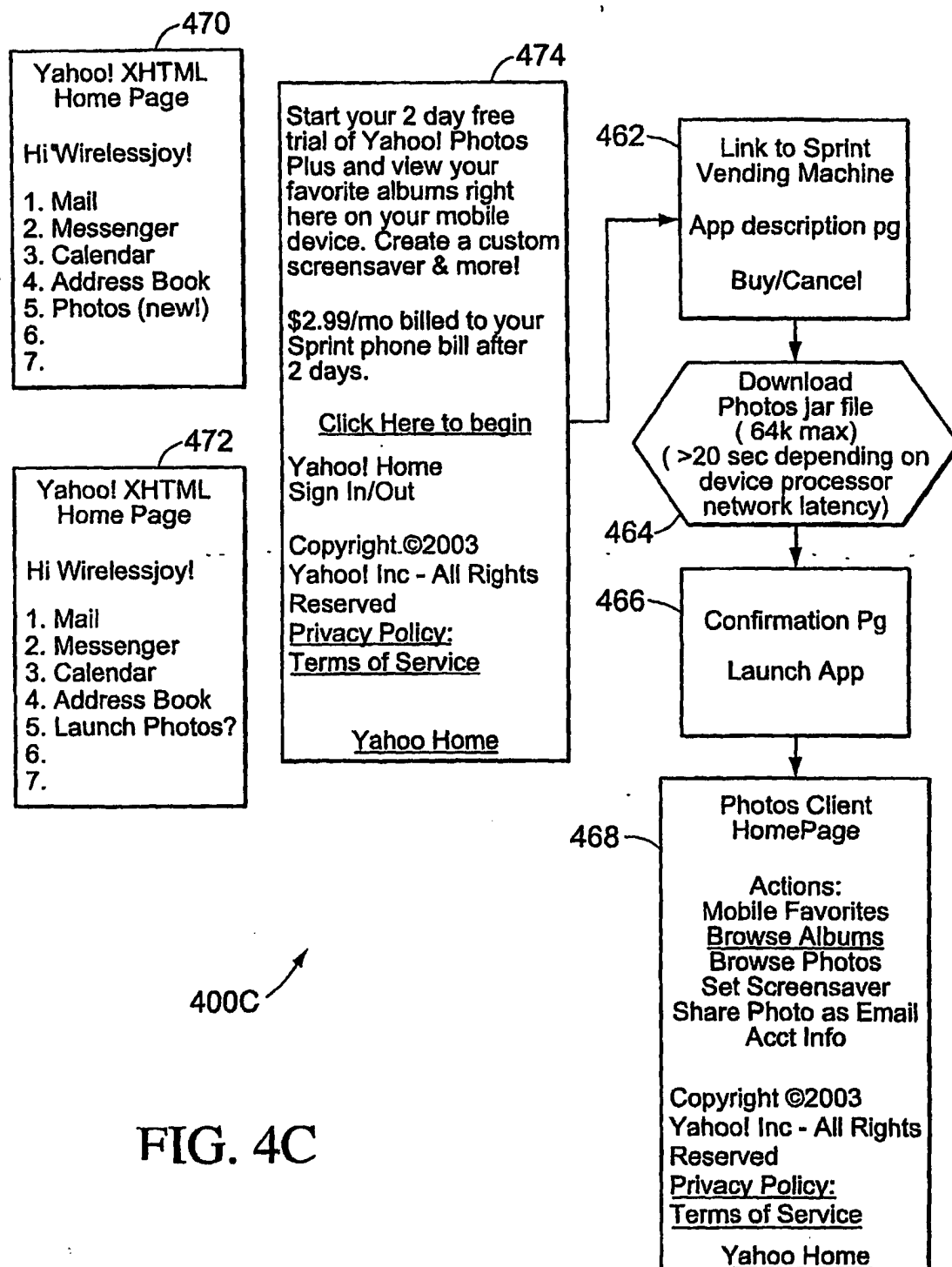
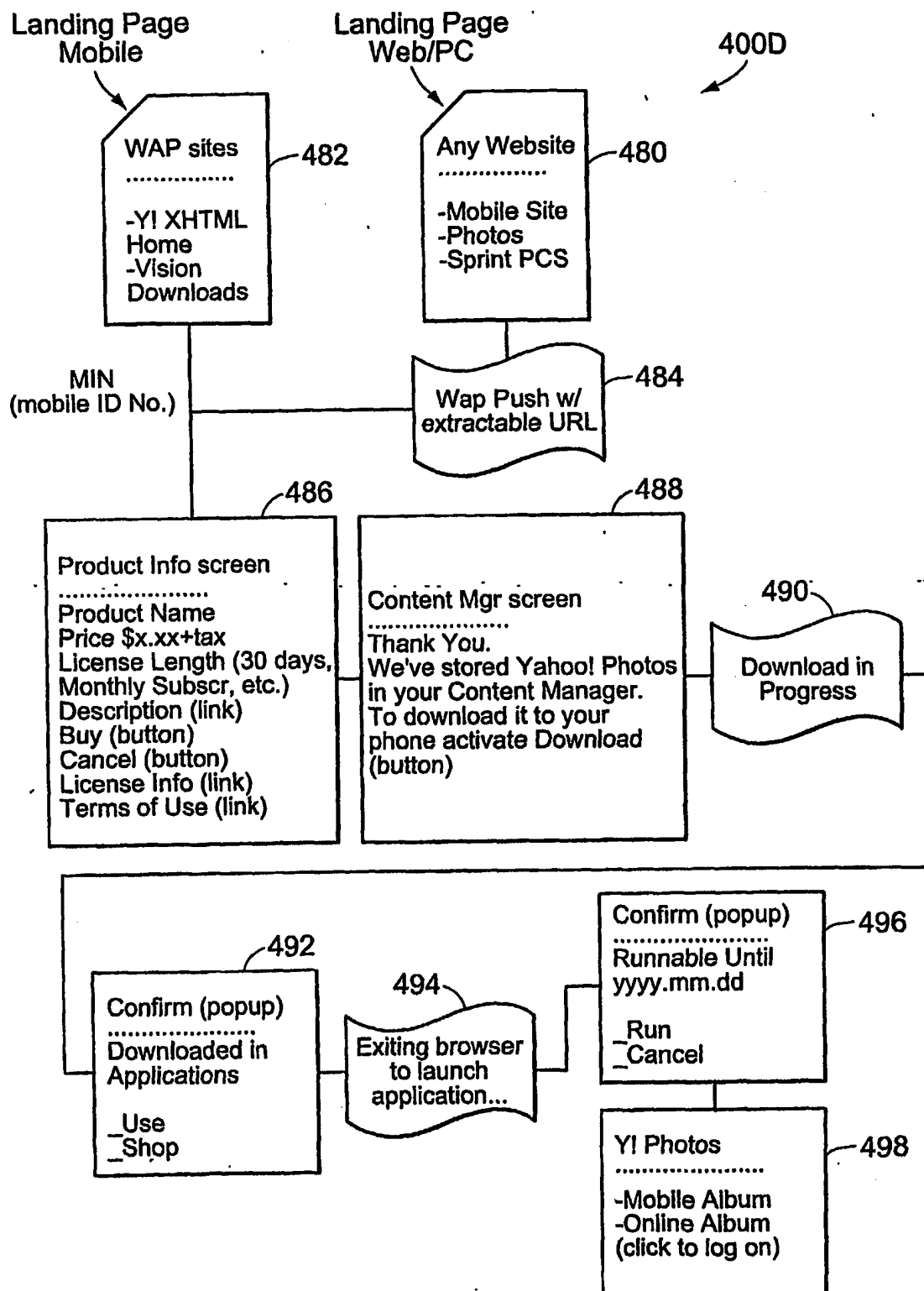


FIG. 4C

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FIG. 4D

## First Time Purchase Flow



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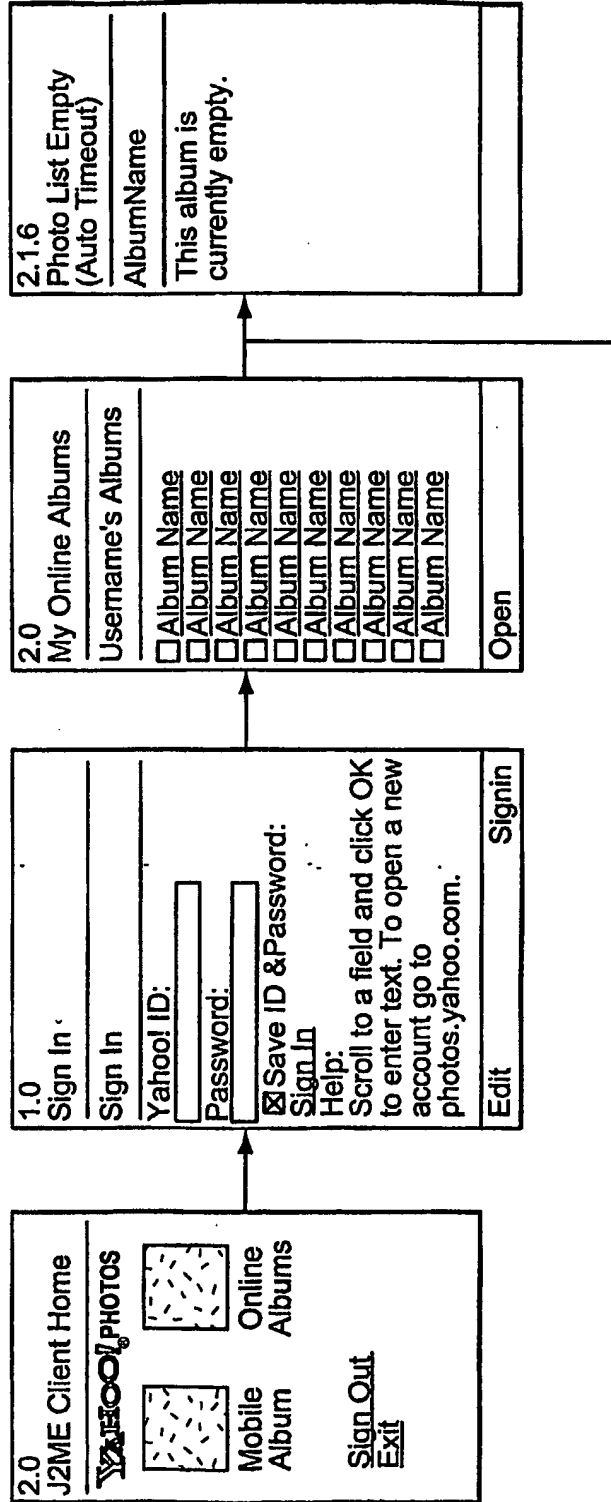
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**FIG. 5A**  
(Part 1)

**Screen Flows**

2.0 Online Albums; 3.0 Mobile Albums

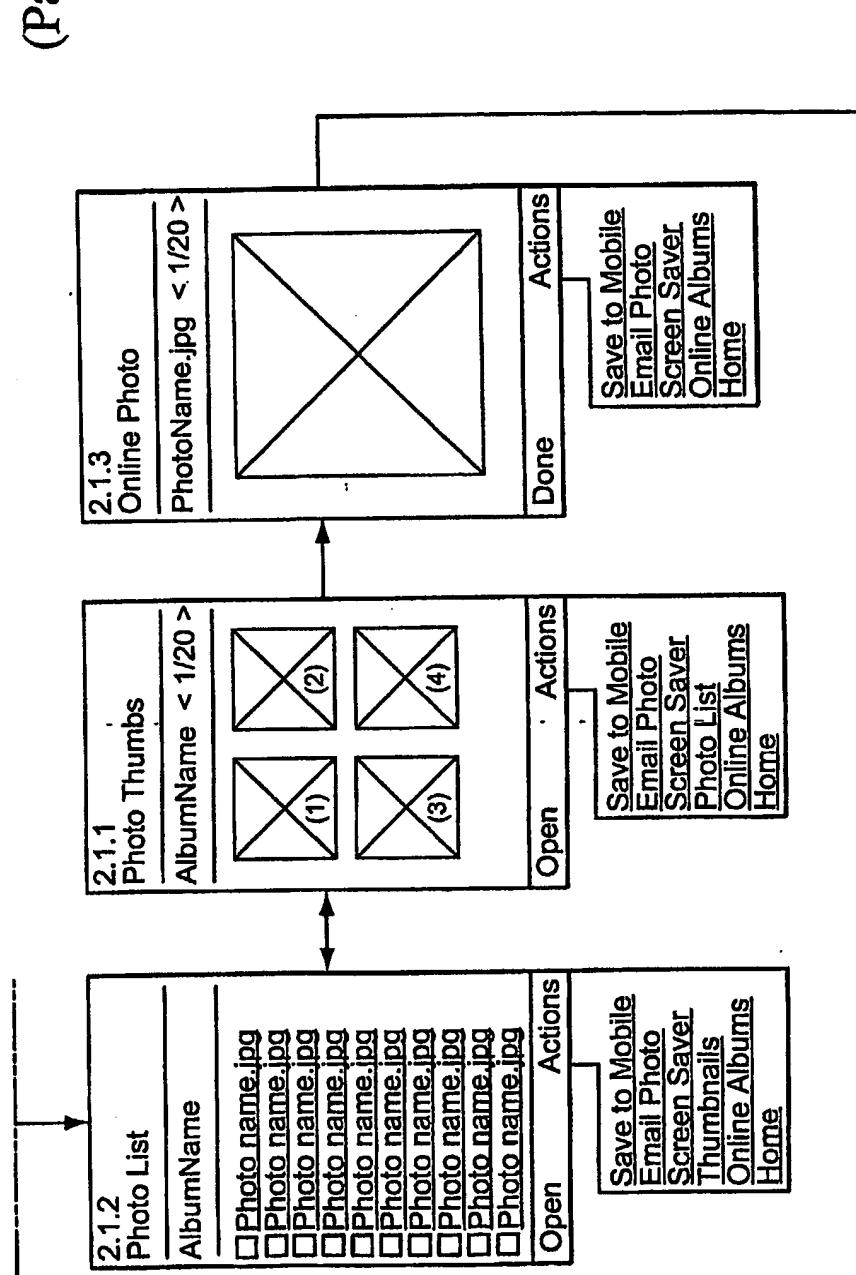
600A



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FIG. 5A  
(Part 2)



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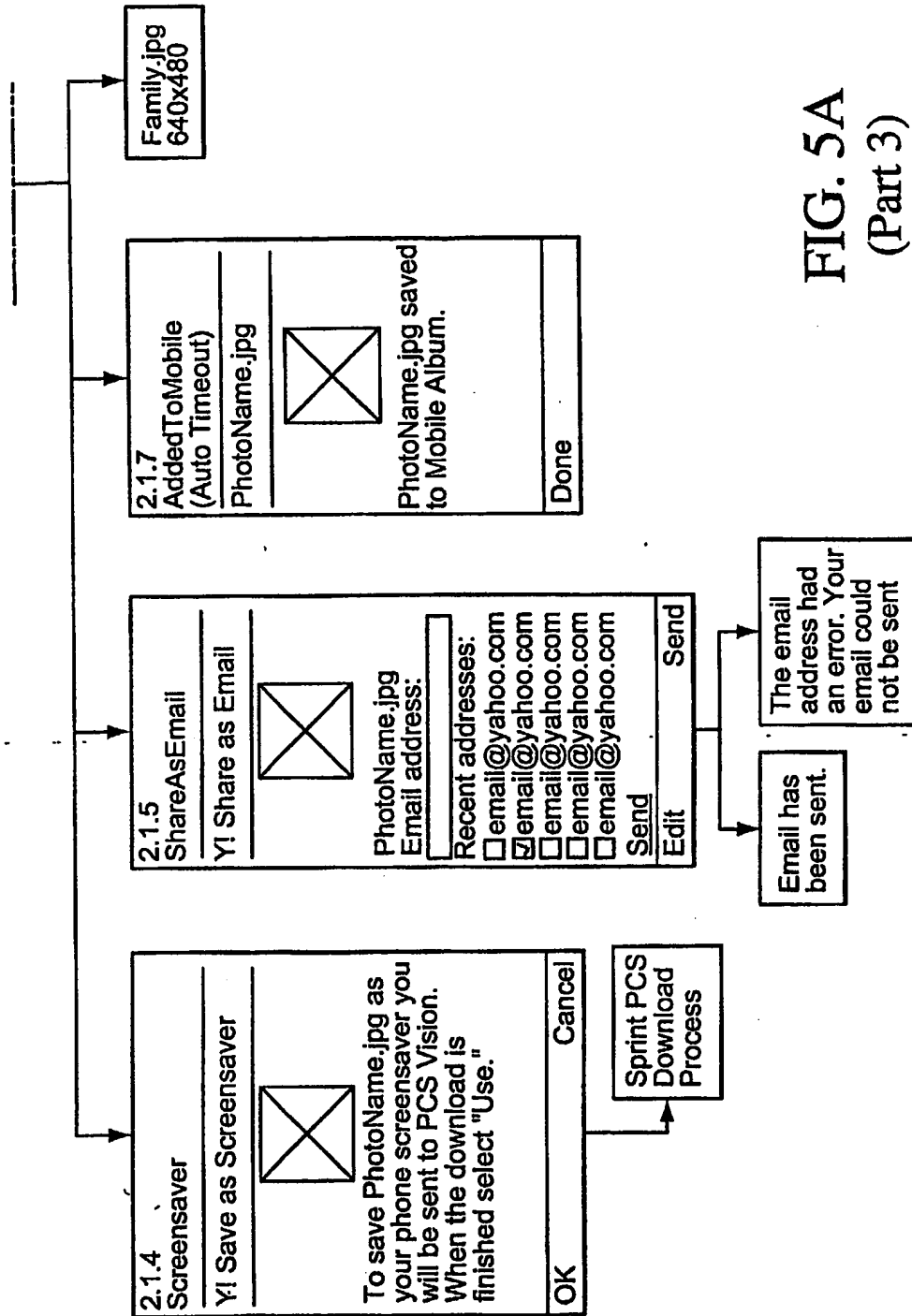


FIG. 5A  
(Part 3)

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## FIG. 5B

(Part 1)

3.1.4
Mobile Album Empty
Y! Mobile Album
Mobile Album is empty. Fill it by adding photos from your Online Albums
<u>Y! My Online Albums</u>
If you previously had photos in your Mobile Album you can restore them now.
<u>Restore Mobile Album</u>

3.1.4
Mobile Restore Info
Y! Mobile Album History
Erasing Yahoo! Photos from your phone also erases your Mobile Album. Press OK to open your Download History and re-save your favorite photos.
OK

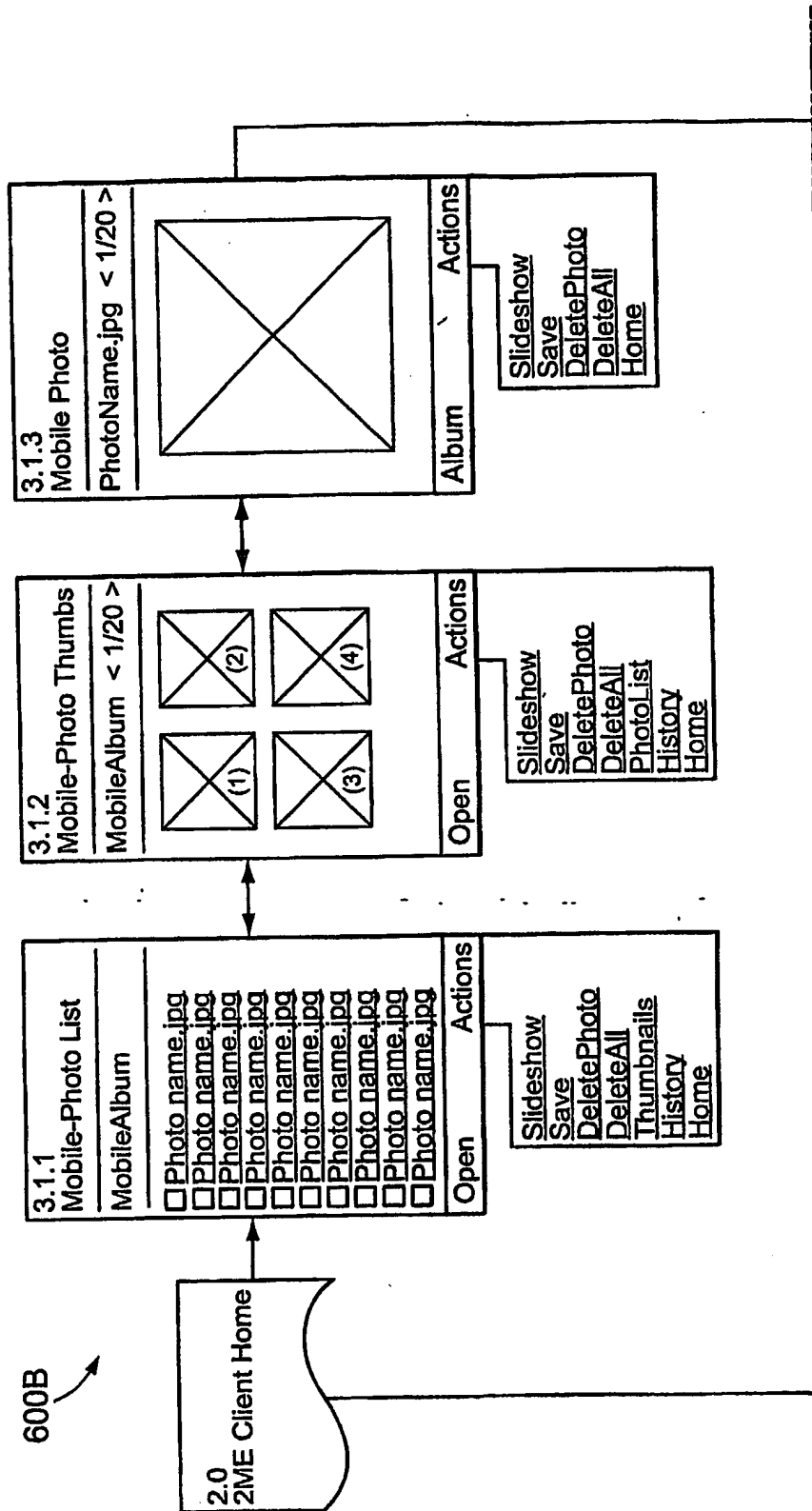
Y! Mobile Album
<u>About Mobile Album</u> <u>Where are my photos?</u>
Open



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FIG. 5B  
(Part 2)

600B



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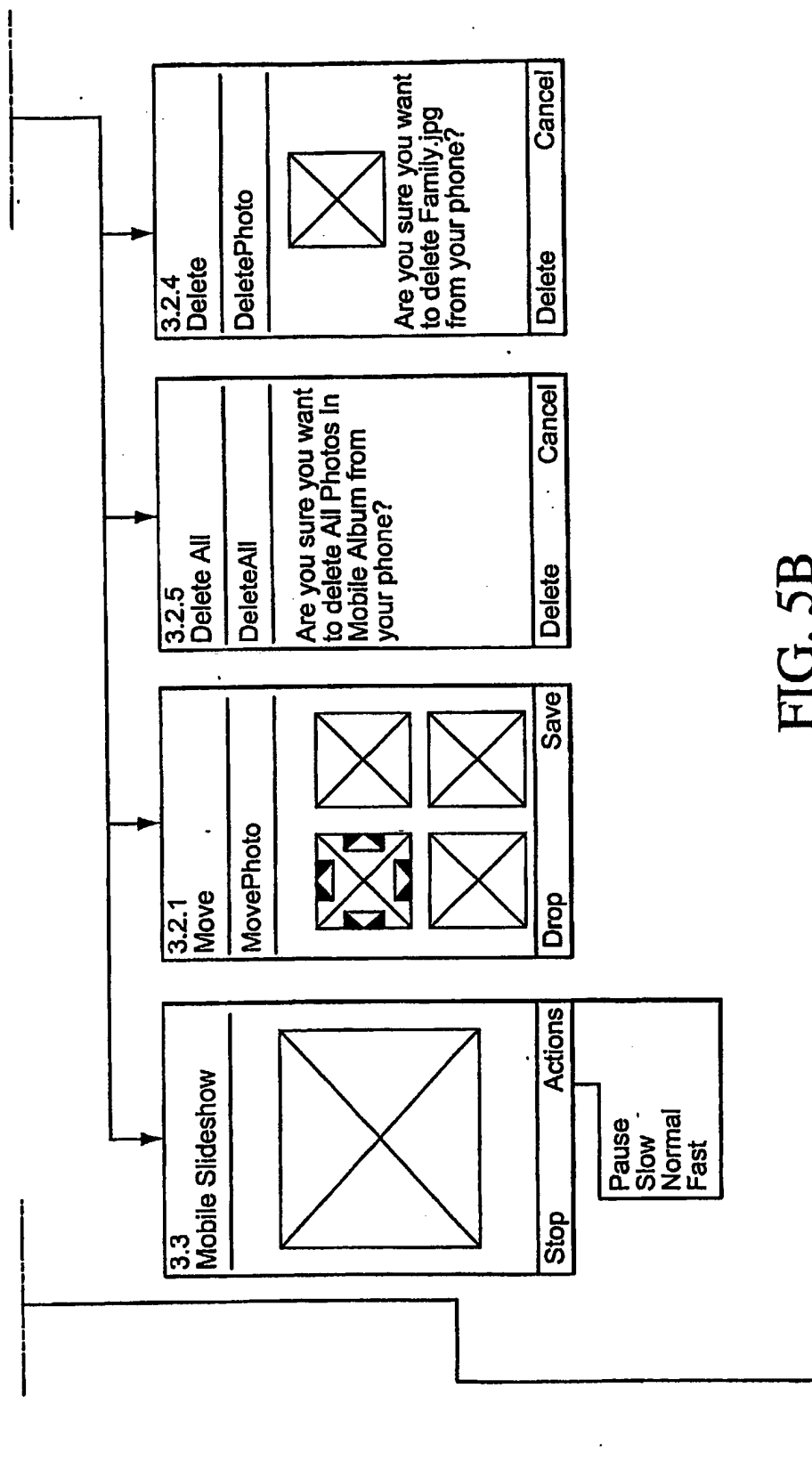


FIG. 5B  
(Part 3)

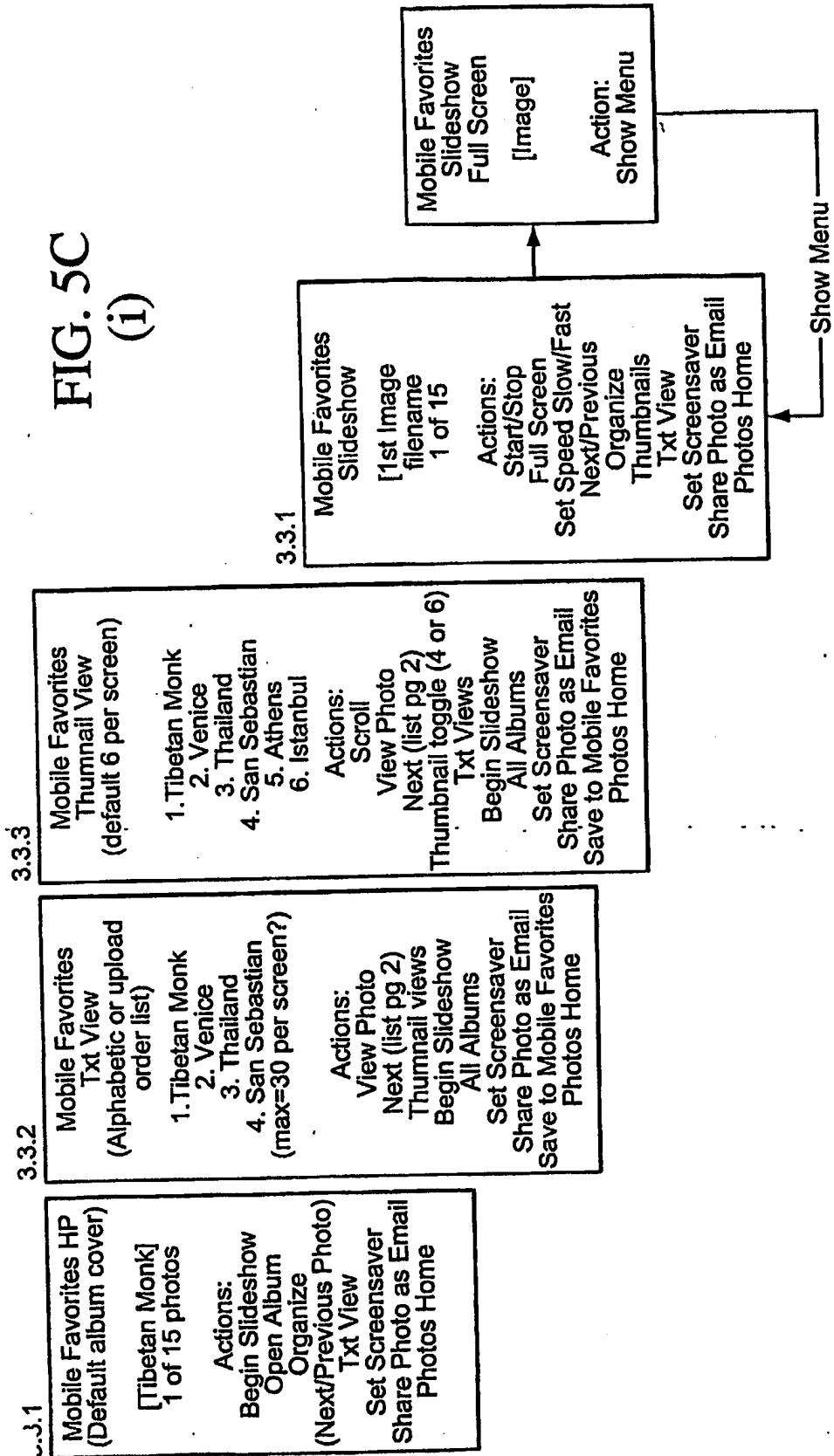


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lient: **Mobile Favorites**

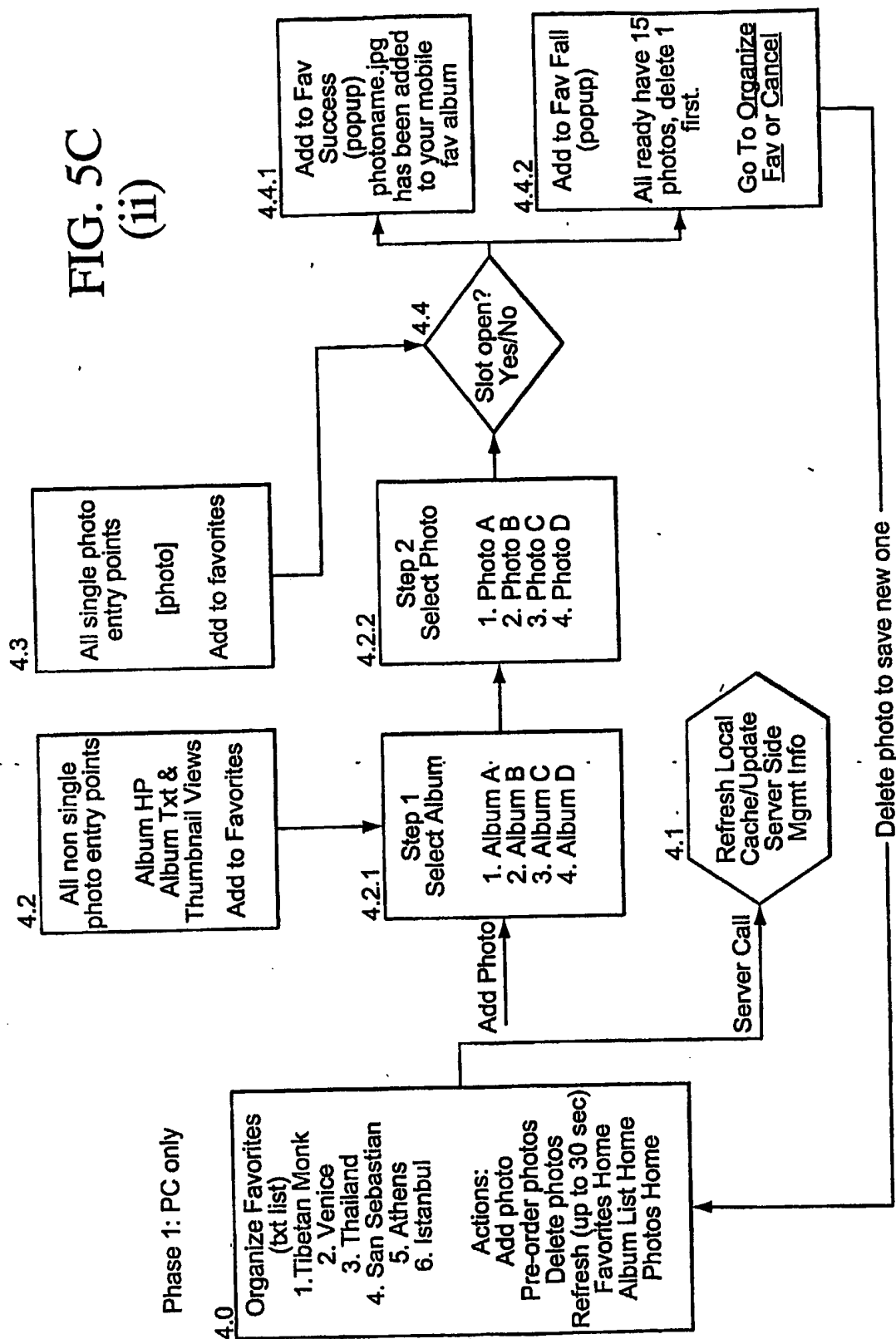
Mobile Favorites: Slideshow  
15 photo max, saved to local cache

**FIG. 5C**  
(i)



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FIG. 5C  
(ii)



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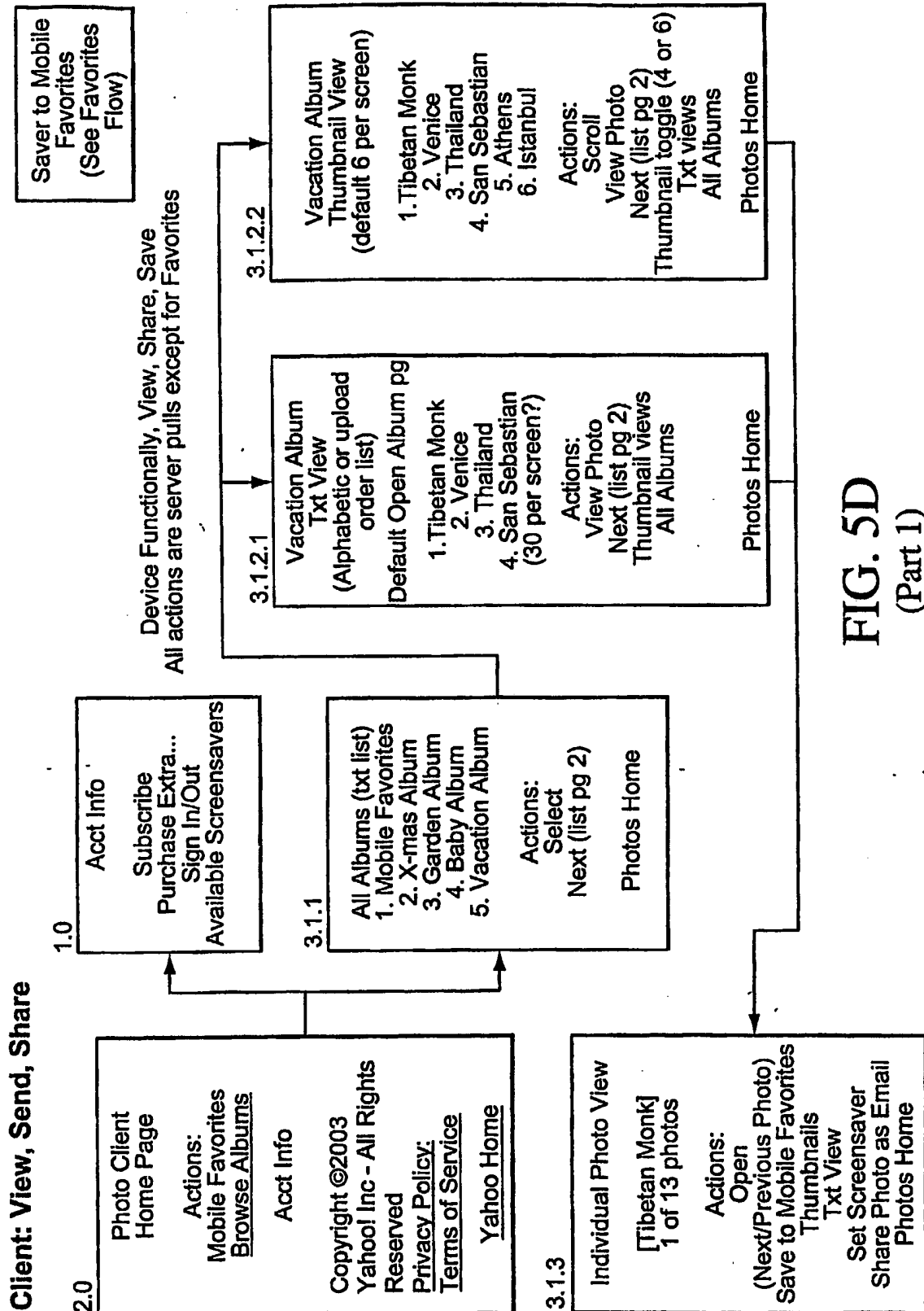


FIG. 5D  
(Part 1)

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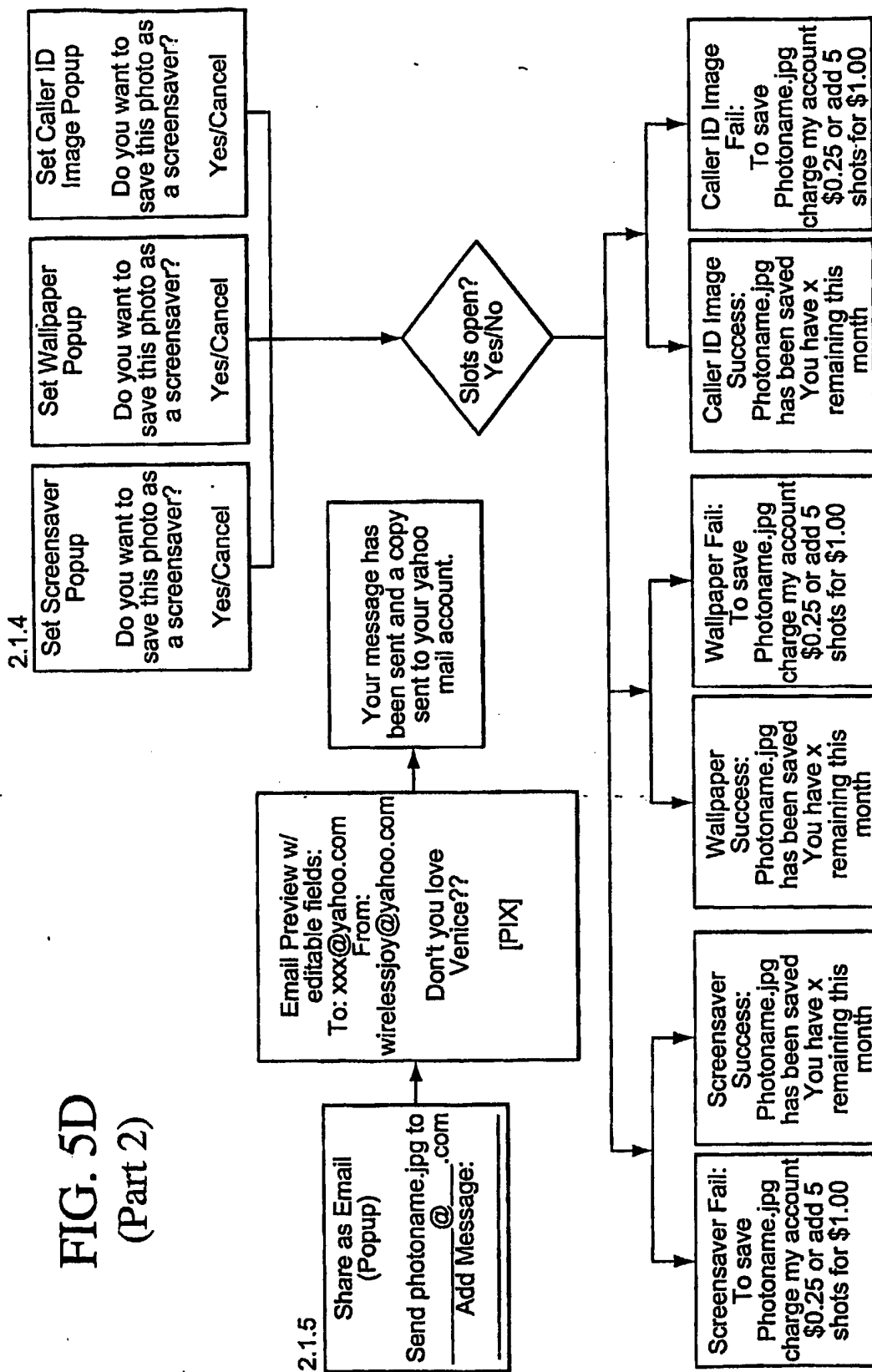
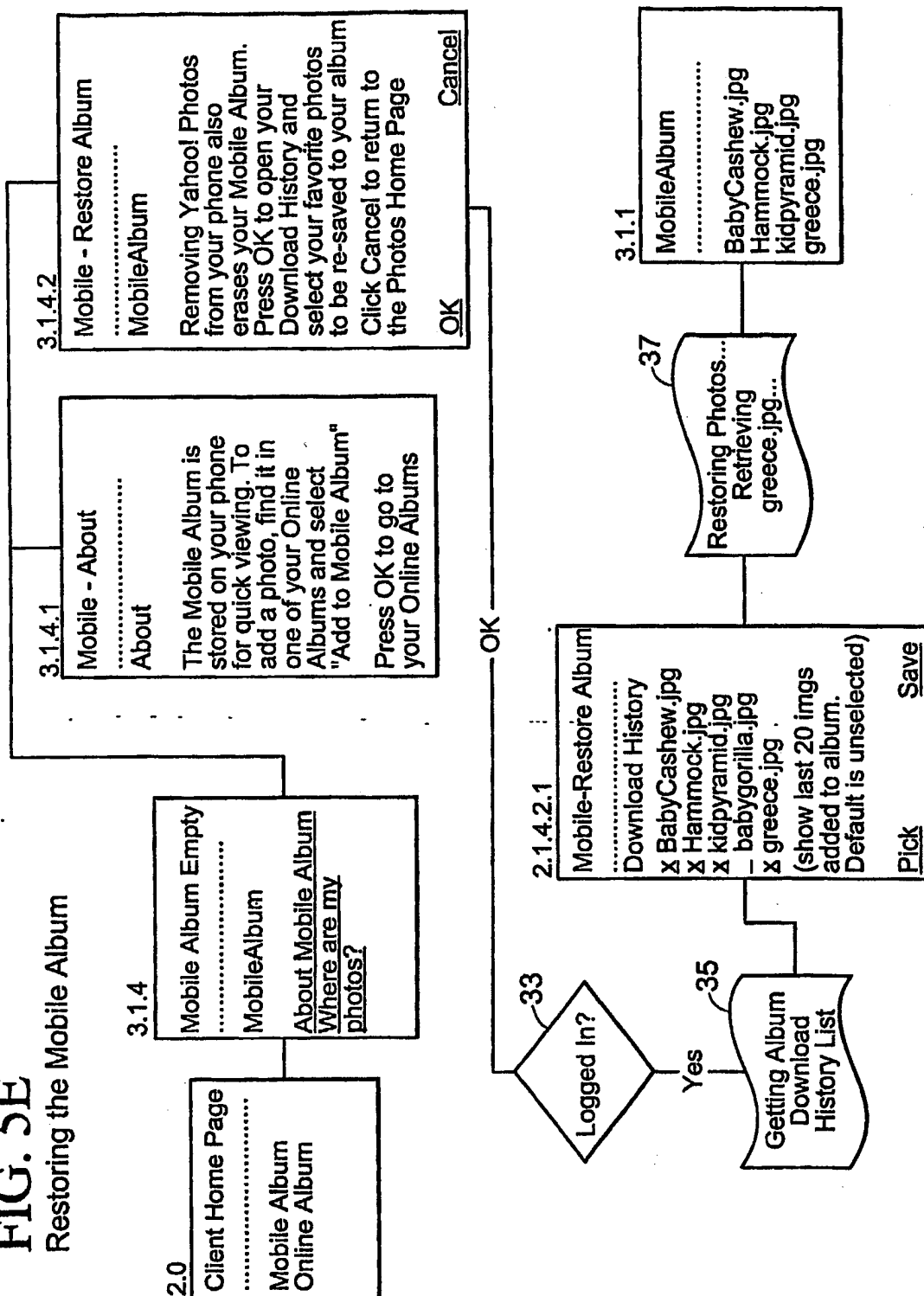


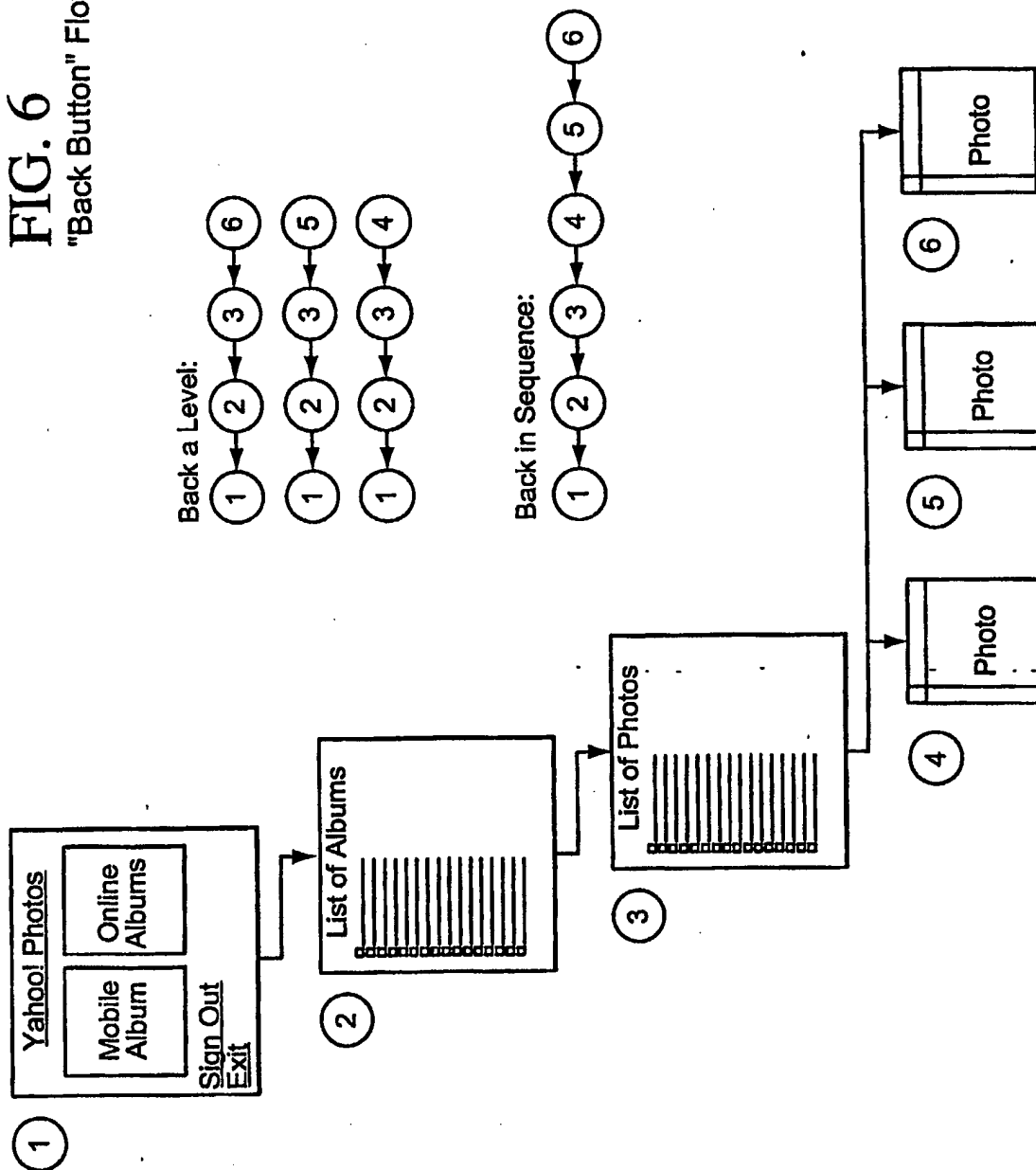
FIG. 5E

Restoring the Mobile Album





**FIG. 6**  
**"Back Button" Flow**

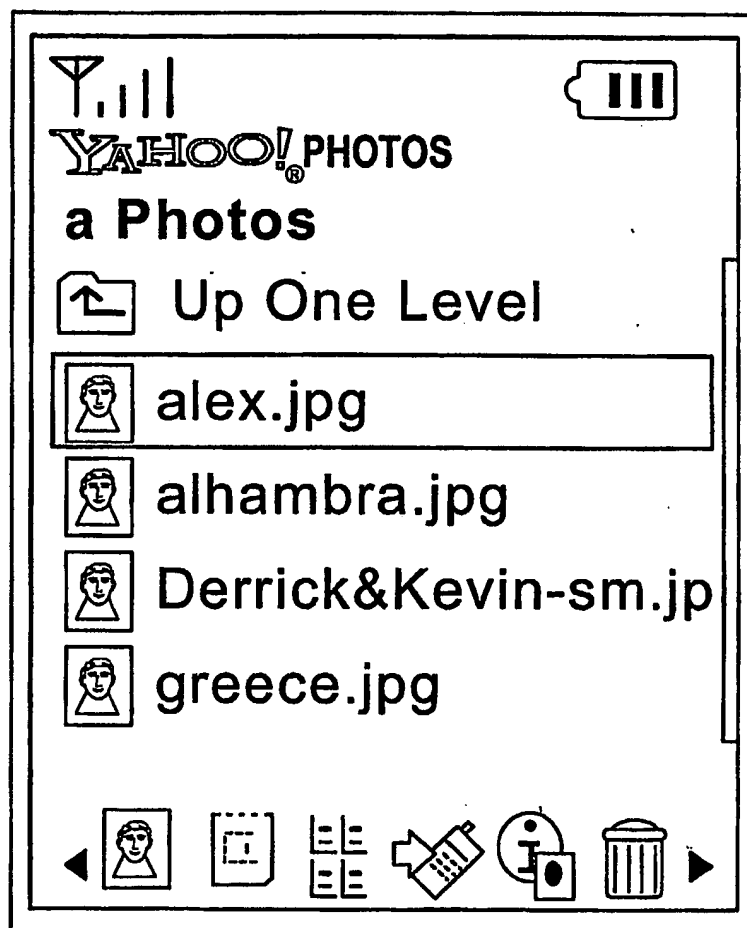


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## FIG. 7

A screen shot: Original Photo Album



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International Bureau



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(54) Title: NAVIGATION PATTERN ON A DIRECTORY TREE

(57) Abstract: Navigation management occurs in a mobile device during a directory up-down scroll and it involves a user interface and a directory (e.g. mobile directory of photos). The directory is a tree-shaped hierarchy of nodes such that any node on the directory is selectable by a user via the user interface. This way navigation can flow up-down through the directory. Additionally, the navigation management involves associating a state and one or more action items with each node and saving the state. The state is an expanded or collapsed condition of the node. If the state of a particular node is expanded, additional nodes at a lower level of the hierarchy are presented to the user. If its state is collapsed only that particular node is presented and the other nodes are hidden. The user interface includes for any node selected by the user its associated one or more action items.



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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/37718

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G09G 5/00  
US CL : 715/764,853

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 715/764,853

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2003/0142953 A1 (TERADA et al) 31 July 2003 (31.07.2003), page 1, paragraph 0012, page 3, paragraph 0051, page 4, paragraph 0058 and Figures 2-5.	1-25
Y,P	US 2004/0023686 A1 (KING et al) 05 February 2004 (05.02.2004), page 1, paragraphs 0007-0009, page 6, paragraph 0075 and page 7, paragraph 0076.	1-25

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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